EUROPE 1992 AND CANADA'S SOFTWARE INDUSTRY

E SOFTWARE MARKET

ITALY

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CANADA EUROPE

External Affairs and International Trade Canada

Canada

EUROPE 1992
AND
CANADA'S SOFTWARE INDUSTRY

THE SOFTWARE MARKET IN ITALY

prepared for

European Community Division
External Affairs and International Trade Canada

by

KPMG Regis McKenna Italia

November 1991

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1. INTRODUCTION

1.1 Objective of the Assignment

KPMG Regis McKenna Italia conducted this investigation for the Canadian Government as part of a study of 1992 market opportunities in Europe. The objective of this study is to give Canadian software companies relevant and practical information on opportunities in the Italian software market.

To do this, we analysed several product niches that will be of interest to Canadian industries:

- computer-aided software engineering (CASE);
- object-oriented programming (OOP);
- fourth-generation languages (4GLs) and database management systems (DBMS);
- geographical information systems (GIS);
- multimedia and image-processing graphics and software;
- connectivity and networking applications;
- utility and productivity tools; and
- health information systems (HIS).

We also define entry opportunities for each of these market segments.

1.2 Organization

The document is organized as follows:

- brief overviews of the global and European software markets to show trends and how Italy fits in;
- an introduction to the Italian software market (size, growth, supply, demand), focusing on the major players, relationships, mergers and acquisitions, and peculiarities that characterize the business in Italy; and
- an analysis of each of the niche markets of interest to Canadian software companies (demand, market size and growth, major players, major customers, market opportunities, promotion and opinion makers). Reliable data for the various sectors are very difficult to obtain, even from the most prestigious data-search companies. The problem is that the software market is fairly new, is volatile and has a very large number of small players.

1.3 Approach

Considering the characteristics of the high-technology field and of the software sector in particular (dynamism, short life cycle of products), we believe that quantitative and qualitative data can indicate future directions and suggest market-entry strategies. We gathered qualitative information through interviews with major operators and opinion makers in the sectors specified above.

Table 1 summarizes the characteristics of each segment of the software market in Italy and the entry opportunities for Canadian software houses.

Figure 1 suggests how to approach the various segments of the Italian software market.

Figure 2 elaborates on Figure 1: it also includes the importance of lobbying in the decision-making process (awarding contracts, purchasing) and of products (relative to services) in the segments of the Italian software market.

Table 1
Italian software market: major findings

Areas	Entry opportunities for Canadian SW houses	Italian market	
		Plus	Minus
CASE/OOP	-	• Foreign products dominate market.	• The demand has not shown a clear and mature growth trend yet. • The basic technology already exists, but it needs an aggressive commercial strategy and implementation and maintenance assistance. • Buyers' purchases are strongly related to overall economic situation as CASE is considered an expensive, long-term investment compared with application products.
4GL/DBMS	- -	• Market is product and not project oriented; political and lobby influence is minor.	• Consolidated foreign trademarks have well-established business networks. • There is no particular technological gap compared with other main foreign markets. • End-users lack programming and implementation skills for these products.
GIS	+	• Foreign presence is well established (e.g., ESRI). • Market has very high potential (over 6,000 municipalities have to invest in the short term). •Technological quality is a criterion in software selection.	• LPA and CPA have a strong influence in decision making. • Market demand is subject to national governmental investment policies and regulations.
Image-processing and graphics	++	• High growth rate is expected, although implementation technologies have not been developed in detail. • Good opportunities exist in particular fields (computer-based training, document-management systems, computer graphics).	• As the market is not consolidated yet ("confused environment"), the entry strategies (selected niches, products, distribution channels, etc.) have to be clearly defined.

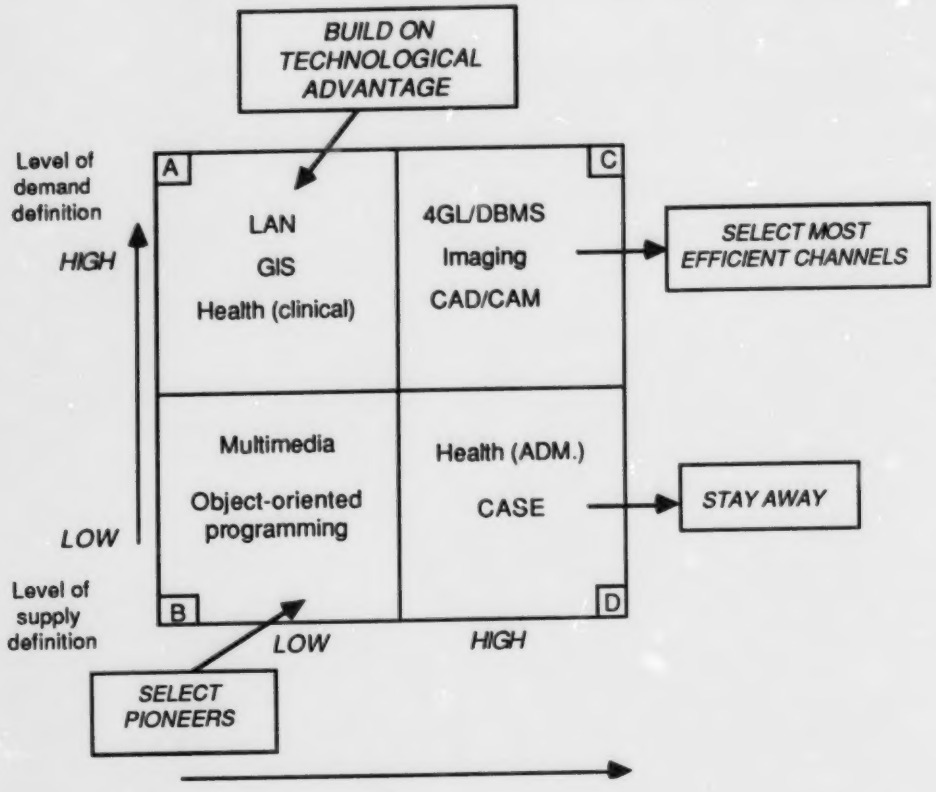
Table 1
Italian software market (cont'd)

Areas	Entry opportunities for Canadian SW houses	Italian market	
		Plus	Minus
Connectivity and networking	++ distributed systems - WAN + LAN	• Demand exceeds vendor capabilities in terms of global supply of solutions. • LAN market is characterized by very fragmented supply incapable of offering integrated services and products. • Medium-sized companies have to spend considerable amounts in networking systems in the short term.	• Market is not technologically mature enough to make the right investment decisions and organizational commitments. • WAN market is dominated by national telecommunications corporations and major hardware vendors. • Italian industry has only a few large corporations capable of making large investments in networking systems.
Utility and productivity tools	• Market is not considered as a stand-alone one because of the great variety of products included in this area (CASE, data communications, 4GL/DBMS).		
HIS	++ Clinical/ diagnostic - - Admin./ mgmt. systems	• Market is far behind compared with other European health system infrastructures. • Governmental influence is less evident on clinical and diagnostic products where hospital high-level staff has more autonomy. • Particular technical-application niches (e.g. veterinary, environmental hygiene) are insufficiently covered.	• Administration-management-health-application market is heavily controlled by public-sector decision makers (CPA and LPA). • Very fragmented local supply is strongly connected to political environment. • Long-term investment by foreign software companies is required because of delays in automating, especially in private organizations.

Notes: - - Very few entry opportunities
- Few entry opportunities
+ Many entry opportunities
++ Very many entry opportunities

CASE	computer-aided software engineering
CPA	central public administration
DBMS	database management system
4GL	fourth-generation languages
HIS	health information system
LAN	local area network
LPA	local public administration
OOP	object-oriented programming
WAN	wide area network

Figure 1
How to approach the Italian software market



Notes:

CAD	computer-aided design
CAM	computer-aided manufacturing
CASE	computer-aided software engineering
DBMS	database management system
4GL	fourth-generation language
GIS	geographical information system
LAN	local area network

Figure 2
Importance of public influence (lobbies) and products (compared with services) in the Italian software market

	Approach/Niche	Public Influence (central and local government lobbying)	Importance of products versus services
A	Build on technological advantage		
	LAN	Low	Even
	GIS	High	Low
	Health (clinical)	Medium	High
B	Select pioneers		
	Multimedia	Low	High
	Object-oriented programming	Low	Low
C	Select most-efficient channels		
	4GL/DBMS	Low	Even
	CAD/CAM	Low	High
	Imaging	Medium	Low
D	Stay away		
	Health (admin.)	High	High
	CASE	Low	Low

Notes: A, B, C, and D represent the quadrants in Figure 1.

CAD	computer-aided design
CAM	computer-aided manufacturing
CASE	computer-aided software engineering
DBMS	database management system
4GL	fourth-generation language
GIS	geographical information system
LAN	local area network

2. SOFTWARE MARKET OVERVIEW

2.1 World Market

The world market of information technology (IT) recorded a slowing of its growth rate in 1990 compared with the previous five years. The reasons for this trend are:

- the **recession**, which has affected the major world economies, particularly in the second half of 1990, together with the circumspection and expectation created by the Gulf War; and
- the persistence and intensification of **downsizing** and **downpricing** of systems and the increasing trend toward **standards** and **open systems**.

The consequence has been a decrease in profitability for all major players, with a negative impact over the entire IT sector.

IT market trends throughout all main geographic areas have been similar (see Appendix). The difference in growth between the United States and Europe narrowed slightly. This reflected a stability in the distribution of market shares: North America went from 40% in 1989 to 39% in 1990, Western Europe maintained its 33%, southeast Asia maintained its 20%, and the rest of world passed from 7% in 1989 to 8% in 1990 (source: Nomos Ricerca).

The serious decline of gross margins on equipment, the growing requirements for system integration, and the need to provide systems management with functions that become critical in an open-system environment will cause a shift in IT industry revenues from equipment to software and services that will account for 44% of total revenues by 1995 (see Appendix, Figure A1).

Examples of major innovations in software technology are:

- *multiprocessor systems*, whose diffusion has important consequences for software solutions;
- *relational databases*, which transform data into information;
- *object-oriented programming*, which will reduce application backlogs in information systems development;
- *sophisticated networks*, which allow users to access data from every office in the enterprise; and
- *open-system standards*, which enable different types and brands of computers to work together more efficiently.

Vendors will be successful if they can cope with technology evolution and help customers adopt new technologies while protecting their previous investments.

Despite the overall decline in 1990 of mergers and acquisitions, the IT industry was characterized by the increase and strategic relevance of mergers and acquisitions. For example, Japanese companies increased the number of agreements they made with U.S. and European companies, while new partnerships between Western and Eastern companies were very important.

A high percentage of operations involved software and services, a further confirmation of the strategic importance of this segment. For example:

- In 1990 IBM signed about 20 agreements related to CASE tools.
- CAP Gemini, the largest European software company, acquired Hoskyns, one of the most important English companies; CA acquired DBMS Inc.; Ask Computer acquired Ingres; and Sybase acquired SQL Solutions.
- U.S. leaders in standard software, such as Microsoft, SCO, Oracle and Lotus, also gained strength through agreements with suppliers of hardware platforms.

Of the top 50 vendors, 36 supply applications software packages, 21 provide CASE tools and 17 operate in the sector of data centre and systems software. Object-oriented programming has its own standards consortium, the Object Management Group, whose members include 6 of the top 50.

Software for open systems is available from 11 vendors, and client- or server-based products are available from 25 of the top 50.

2.2 European Market

According to IDC Europe, the European IT market grew at an average rate of 9.5%:

Segment	Growth (%)
Hardware	
Large	+6.0
Medium	-6.0
Micro	-2.0
Software	+17.6
Services	+10.9

In 1989 the services share of total European IT revenues was 35%. The software share was 17%, and the hardware share was 48%. The software and services combined share of the overall European IT market should exceed 60% by the end of 1990s (source: IDC Europe).

In 1989 the European software and services market was the world leader, with 37% of total revenues (source: IDC Europe). However, the invasion of non-European players is changing the scenario. U.S. leaders in packaged software, such as Microsoft and Oracle — flexible and global organizations — took away sales from the European software houses. Japanese firms, on the other hand, are aiming to become the leaders in large software projects.

The European Community (EC) estimated the presence in Europe of 20,000 software and services companies. Among the top 20 companies (see Appendix, Figure A2), only a few firms — CAP Gemini Sogeti, SD-Scicon, Logica and Software AG (see Appendix, Figure A3) — earn substantial revenues from other European countries and the rest of the world.

In 1989 the EC promoted the "European Nervous System" as a major project for the construction of new transactional information systems to integrate such public services as social security, instruction, environment, health and social insurance. Because of financial difficulties and the opposition of national public administrations, the European Nervous System is still at the stage of good ideas after two years.

However, Olivetti, Bull and Siemens-Nixdorf, the three top European IT vendors, with revenue losses of about 10%, signed an agreement for feasibility studies of projects included in the European Nervous System project, underlining the necessity for European countries to work together.

The difficulties inherent in operating in national markets and the necessity for new structures for post-1992 European industries and administrations are responsible for an increasing number of mergers and acquisitions. For example:

- CGS acquired more than 30 European software houses;
- EDS acquired SD-Scicon;
- France Telecom acquired SCBF;
- **Finsiel intends to sign agreements with new European private partners (possibly Olivetti); and**
- multinational companies (IBM, Digital) are interested in concluding agreements with European software companies.

2.3 Italian Market

2.3.1 Market Size and Growth

As indicated in Tables 2 and 3, growth in the IT business in Italy slowed down from 1988 to 1990. The hardware sector's share of the market dropped from 10.7% (1988-89) to 5.9% (1989-90). The growth rate of 18.4% in software and services, a slight drop from 20.9%, shows that this segment remains stronger compared with the overall market and, in particular, the hardware market. Nevertheless the software and services sector in Italy still felt the effects of the remarkable slowing down typical of the global software business.

Table 2
Information technology market in Italy, 1988–90
(billion lire)

	1988	Share (%)	1989	Share (%)	Growth 1988–89 (%)	1990	Share (%)	Growth 1989–90 (%)
Hardware	9,440	62.7	10,510	60.8	11.3	11,130	58.1	5.9
Software and services	5,610	37.3	6,780	39.2	20.9	8,030	41.9	18.4
Total	15,050	100.0	17,290	100.0	14.9	19,160	100.0	10.8

Source: Assinform/Nomos Ricerca.
Note: 1 billion lire = $C 957,855.

Table 3
Information services market in Italy, 1988–90
(billion lire)

	1988	Share (%)	1989	Share (%)	1990	Share (%)
Data-processing services	1,122	20.0	1,220	18.0	1,355	16.9
Software products	2,132	38.0	2,576	38.0	3,025	37.7
Professional services	2,356	42.0	2,984	44.0	3,650	45.4
Total non-captive	5,610	100.0	6,780	100.0	8,030	100.0
Total including captive	6,700		8,040		9,480	

Source: Assinform/Nomos Ricerca.
Note: 1 billion lire = $C 957,855.

2.3.2 Demand

Large-sized buyers have continued their investments in electronic data processing (EDP) as forecast. Smaller companies, on the other hand, have reduced their purchasing. Their buying activities have focused on:

- automating the maintenance of existing installations;
- substituting applications and developing large information projects; and
- increasing automation level, computation power and memory capacity.

2.3.3 Supply

The number of suppliers has been reduced by mergers and acquisitions and by new relationships between hardware suppliers and third parties offering complex supply systems. Market trends have also been influenced by the constant reduction in the price of hardware, which is more consistent for hardware manufacturers than for end-users. Since 1988, manufacturers' turnover has increased by 5%, while dealers' turnover has increased by 15%.

An analysis of demand shows that saturation is not causing the current crisis in the market. Rather, suppliers appear unable to understand and satisfy users' needs. This situation has led to the following market characteristics:

- The role of software and information services, such as management and EDP consulting, was of great importance. The segment that contributed the most to the growth of the market was professional services, whose positive trend may be attributed to the growth

of the market relative to system integration and facilities management.

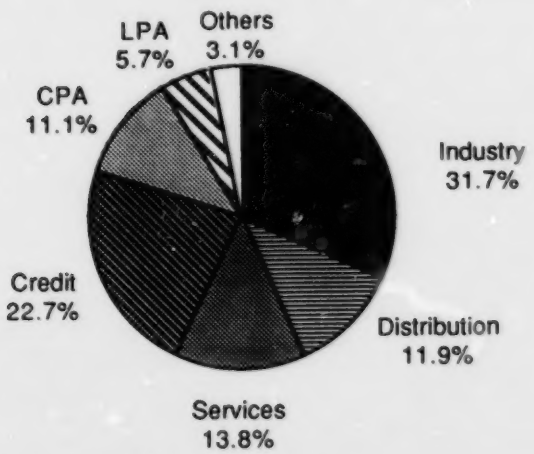
- Software products showed consistent growth in platform software and application software. This was offset, however, by problems of decreasing profitability caused by highly competitive prices and by increasing costs associated with distribution channels.
- The data-processing segment showed limited growth. Handling single applications or clusters of applications requires a level of experience that suppliers do not have yet.
- The growth in value-added services (VAS) was less than expected.

Table 4
EDP expenditures in Italy by sector, 1988–90
(billion lire)

	1988	1989	Growth 1988–89 (%)	1990	Growth 1989–90 (%)
Industry	4,850	5,495	13.3	6,017	9.5
Distribution	1,750	2,023	15.6	2,250	11.2
Services	1,990	2,325	16.8	2,610	12.3
Credit					
Banks	2,855	3,226	13.0	3 565	10.5
Insurance and financial institutions	555	650	17.1	735	13.0
CPA	1,633	1,868	14.4	2,113	13.1
LPA	835	967	15.8	1,082	11.9
Others	462	546	18.2	588	7.7
Total	14,930	17,100	14.5	18,960	10.9

Source: Assinform/Nomos Ricerca.
Notes: CPA central public administration
LPA local public administration

Figure 3
EDP expenditures in Italy by sector, 1990



Source: Assinform/Nomos Ricerca.
Notes: CPA central public administration
LPA local public administration

The breakdown of demand for EDP by sectors as outlined in Table 4 and Figure 3 indicates the following trends:

Industry. This sector's demand for EDP decreased from 32.5% in 1989 to 31.7% in 1990, mainly because of the negative trend in demand for hardware. The slowest sectors were textile and mechanical. These were also the first to be affected by the worldwide recession.

Distribution. This sector's demand for EDP showed an above-average growth rate. However, many companies in the sector are still tied to traditional distribution practices and are not very open to the introduction of information systems. The factors that make IT investments a key to competitiveness are:

- concentration; and
- selectivity in the sector.

Services. In the last two years the average growth in EDP demand was 14.5%, above the expected level. The availability and use of the most advanced IT tools differentiate companies operating in this sector. The factors that will continue to guarantee relevant investments in IT are:

- the sizes and types of the service companies' main activities; and
- the growing importance of business services.

Credit. The sector is characterized by the concentration of demand and the large-sized users involved in organizational changes. Expenditures for hardware are less than for software.

1. *Banks*

The upward demand for software and services is a function of the strategic role played by IT in the banking business. Notable areas of development are:

- automation of new agencies;
- traditional banking services (loans, credits, guarantees);
- new services (remote banking, cash management);
- payment systems;
- bank relations (check truncation, bank networks)
- management services (planning, marketing information systems, management control); and
- treasury.

The new demand for products and services is affecting the traditional supply business. New operators are emerging: consulting firms, companies operating internationally, etc.

2. *Insurance and financial*

This sector will use IT as a strategic element to meet the challenge of the post-1992 European market. Major investments by this sector include:

- marketing and decision support systems;
- telecommunications, to guarantee the integration between main offices and agencies; and
- point-of-sale (POS) support at the peripheral level.

Central Public Administration (CPA). The positive performance, especially in the area of services, is explained by the necessity to catch up to the technological level of other market segments. The recent approval of laws requiring administrative decentralization has resulted in organizational efficiency and better services. Consequently it is important for CPAs to define standards, architectural models for equipment and software conformity. Possibilities for software firms include partnerships between suppliers and public customers.

Local Public Administration (LPA).

1. *Regioni*

The market represented by the Italian *regioni* (similar to Canadian provinces) is relatively static. There are a few new projects under way:

- development of territorial and environmental information systems; and
- construction of observatories.

2. *Comuni*

Comuni (municipalities) are generally involved in:

- the substitution or completion of procedures (particularly administrative ones); and
- first-level automation of their offices.

3. *Health care*

The most dynamic area in the public domain is health care:

- Hospitals need new applications to deal with logistics and office automation.
- Local health units require applications for territorial integration and for the management of health services.

Main obstacles to the diffusion of IT at the local level are the scarcity of funds their diffused use, and problems establishing procedures and harmonizing technological standards.

2.4 Present scenario

The software market in Italy is dominated by a few giants, such as Finsiel, Ois and Enidata. There are about 35 medium-sized players (about 30 with a turnover of 25 to 100 billion lire, and only five with a turnover of 100 to 140 billion lire). Finally, there are a large number (more than 4,000) of small and undersized companies, many of which operate at a loss (see Appendix, Table A6).

In addition, large firms external to the IT business, such as IRI, ENI, chambers of commerce, Ferruzzi, STET, Elsag and FIAT, have built up their own IT organizations through acquisitions and agreements with outside software houses (see Appendix, Figure A4). For example, Finsiel has developed into Italy's largest software group through a series of business agreements with strong companies in the market. Hardware vendors like IBM Italia, Olivetti and Bull are developing partnerships with other computer companies.

Foreign groups, taking advantage of the general confusion of the Italian market, are moving toward acquisitions. CAP Gemini Sogeti, a French group with a turnover of about 2,000 billion lire, acquired control of Geda and is now following a policy of differentiation by acquiring Sysdata, AIC and Teleinformatica (see Table 5). Their strategy is to enter specific segments of the private market and generally avoid competing for the public- sector contracts. The French firm Concept acquired CDS and Fienco, while another French company, Sligos, took a 50% position in Engineering and Mesarteam.

2.5 Trends

The most promising hardware applications for software development are PCs and workstations.

As shown in Figure 4, the services segment of the IT market is expected to grow at an average annual rate of 18%, thanks to the increase in demand for:

- system integration;
- personnel training; and
- desktop solutions.

Facilities management is expected to have a growth rate of 18%. Network services should maintain a growth rate of 10%, although the installed solutions of 1990 are limited compared with the potential of this market.

Investments in IT will continue to increase in the insurance, financial and CPA such sectors, with an average growth rate of 20%. The industry and distribution sectors will invest at a slower rate, averaging out to less than 17%. A growth rate of 18% should characterize sectors as universities and research institutes. In services, small hardware platforms will continue to be preferred to large computers.

2.6 Peculiarities

In the CPA and LPA sectors (which are supposed to invest more than 15,000 billion lire in IT by 1994), Italian software houses have to compete with the state holding company, Finsiel. Finsiel is a group of 14 companies that practically monopolizes the public-sector markets. It is controlled by IRI, the largest state holding.

To break into this market, four major players in the Italian software market recently formed a consortium (CIPI), which should give members more opportunities to participate in public-sector tenders. The founding members of CIPI are:

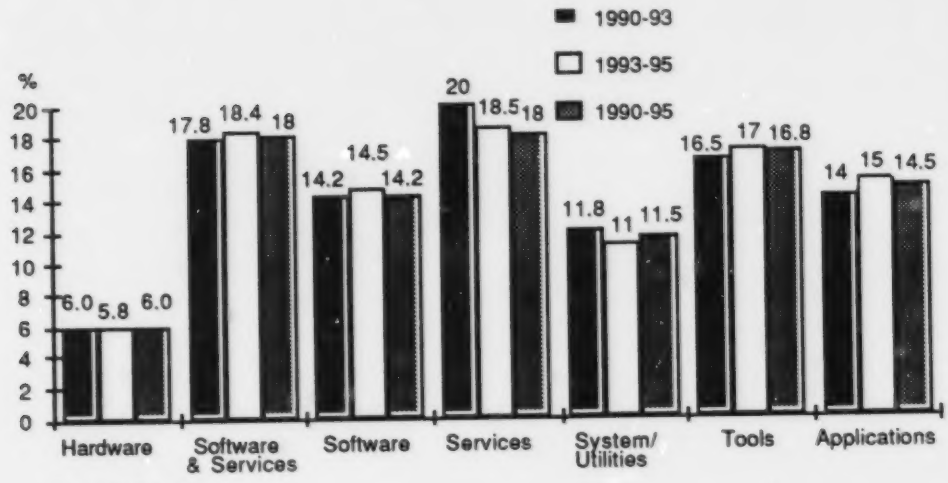
- Engineering, with a turnover of about 70 billion lire;
- Data Base Informatica, with a turnover of more than 100 billion lire;
- Sopin, with a turnover of 61 billion lire; and
- Sipe Optimation, which is controlled by System & Management, a group with a turnover of 130 billion lire.

Table 5
Recent mergers and acquisitions in the IT market in Italy

Acquiring company	IT branch	Target	IT branch	Year acquired	% acquired
IBM Italia	HW	Sistemi Informativi	Business SW	1989	10
IBM Italia	HW	Brignone Informatica	Business SW	1989	15
SIDAC (STET)	Telecom.	Eikon (Olivetti)	Telecom.	1989	N/A
Olivetti	HW	ISC Systems Corp. (USA)	HW/system SW	1989	100
Olivatti Inf. Services	SW	TLC	SW	1989	75
Infos	SW/consult.	Sidi	SW/consult.	1989	91
STET	Telecom.	Geis Italia	Telecom.	1989	40
IBM Italia	HW	Sirio Sistemi	HW/SW	1989	9.9
Tecnost	HW/telecom.	Tiesse Sistemi	System SW	1989	64
FIAR	Telecom.	Inelco-Erisys	Telecom	1989	N/A
Metrologie (F)	SW/services	Celdis	SW/services	1989	100
CGI	SW/services	Dati Sistemi	SW/services	1989	57
IBM Italia	HW	CSM	Business SW	1989	25
IBM Italia	HW	Soleco	Business SW	1989	N/A
IBM Italia	HW	Editel	SW	1989	N/A
IBM Italia	HW	AIS	SW	1989	N/A
Elea (Olivetti)	HW	Systems & Education	Training SW	1989	N/A
IBM Italia	HW	Consulnord	SW/services	1989	10
Gecid (F)	HW/SW	Tria System	SW	1990	100
CAP Gemini	SW/services	Sysdata	SW	1990	25
CAP Gemini	SW/services	AIC	SW	1990	N/A
CAP Gemini	SW/services	Teleinformatica	SW	1990	N/A
Sligos	SW/services	Mesarteam	SW	1990	65
IBM Italia	HW	RA Computers	SW	1990	9.9
SIGE Investiment	Merchant bank	Systema	SW	1990	30
IBM Italia	HW	Ipacri	Banking SW	1990	5
Rinpiave (Stefanel)	Apparel	Brain Informatica	SW	1990	100
Roland DG	HW/telecom.	Sincad Technology	CAD/CAM	1991	50
Alcatel	Telecom.	Telettra	Telecom.	1991	65
Bosch	Electronics	TTN Sistemi	Telecom.	1991	51
Coment	Telecom.	STM	Telecom.	1991	15
Finsiel	HW/SW	Eurosystem	SW/services	1991	60

Source: KPMG Peat Marwick.

Figure 4
Italian IT market estimated growth rate, 1990–95



Source: IDC Italia.

Because of political realities and habits, however, government ministries continue to assign most of their projects to software companies controlled by public entities.

Similar problems with access to the public market are evident in the three associations representing software houses:
- Unimatica (which is small and does not intervene in main events);
- Anasin (which belongs to the Institute of Directors and includes all major public companies); and
- Assintel (which was born as a secession act from Anasin).

Many of the 4,000 software houses that are not included in the list of the top 20 are too small, are rarely profitable, and lack expertise and methodologies.

Another difficulty plaguing the development of the software business in Italy is software piracy, which is not controlled by a specific law.

According to the Business Software Alliance (the international association of software suppliers), for each original package sold at least four were illegally copied. The total damage was estimated in 1990 to be 950 billion lire. The reasons for the phenomenon are:
- price (in Italy software costs 25% more than in the United States, rising to 40–50% more for the Italian versions);
- disregard for the risks (users with illegal copies receive no assistance, no updates, no Italian versions; viruses are also a threat); and
- lack of demos and faith in dealers and suppliers (users copy products to test reliability and quality).

The EC recently promulgated a directive for software protection to be applied by 1993. The usual Italian delay in conforming to EC instructions and the Italian habit of issuing complementary directives lead many software players to believe that the piracy problems will be not solved in the short term.

According to IDC Italia, while foreign companies are taking advantage of the general situation of confusion characteristic of the Italian software market, only a limited number of Italian players will survive. Medium-sized software companies (turnover less than 50 billion lire) for example, have the following alternatives:
- allow themselves to be acquired;

- grow quickly to reach a turnover of at least 70 billion lire;
- build up a network model; or
- follow the association model.

Systems & Management is a typical mid-sized Italian firm that has followed the network model. It has protected itself by expanding geographically through agencies and local partnerships, by specializing through acquisitions and agreements, by participating in research projects, and by forming partnerships to guarantee technological advances and help cover financing.

The association model should allow companies with a turnover of at least 30 billion lire to expand outside Italy through links with foreign companies. This is the case with ESA, which acquired J-Soft and is now expected to sign agreements with the British company Pegasus and software companies in France and Spain.

Companies that cannot grow to an adequate size are destined to be acquired or to disappear unless they specialize in very specific niches either by geography or by business sector. This last option requires a high degree of professionalism, ability and know-how, which most Italian software houses do not possess.

Finsiel, characterized by low-level diffusion of advanced technologies and anchored to an old organizational model, is destined to face competition. In particular, it must watch out for national competitors that offer higher quality and for large international companies that offer vertical integration.

According to a study conducted by Censis, only 2.1% of Italian software revenues came from exports in 1989. The percentage is expected to rise to only 4.9% by 1992.

3. COMPUTER-AIDED SOFTWARE ENGINEERING (CASE)

3.1 Definition

CASE. All tools that provide computer-automated assistance of software systems in:
- development;
- maintenance; and
- project management.

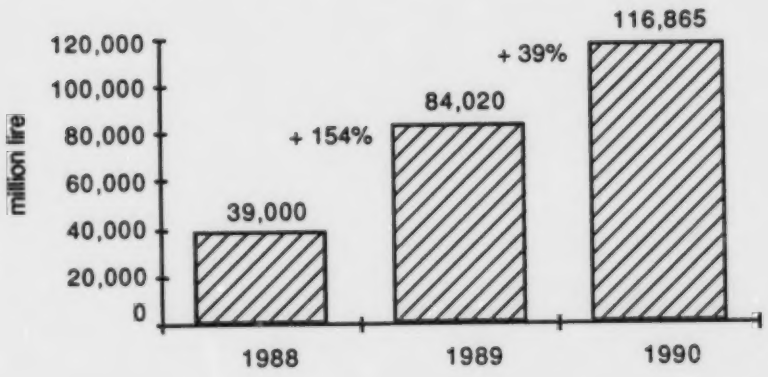
Such tools have to allow:
- data and relationship definition (repository);
- creation of graphics from information obtained;
- creation of screens and report prototypes;
- use of automatic code generation;
- production of documentation; and
- correct administration of projects, including planning, budgeting, control and management.

3.2 Market Size and Growth

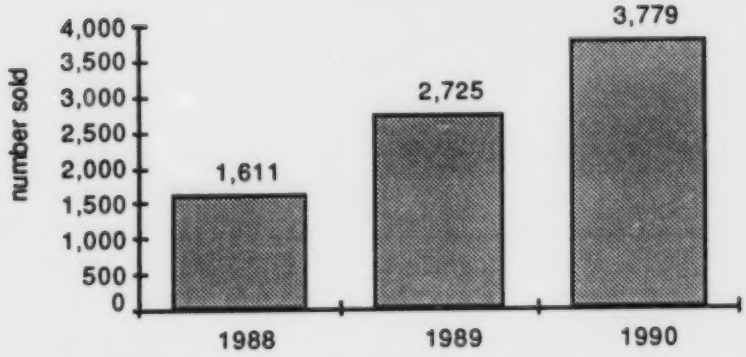
Figure 5 shows the size of the CASE market in Italy for 1988-90.

Despite having a market growth rate that is higher than that of the average IT product, CASE in Italy has not yet left the pioneer stage.

Figure 5. (a) CASE market in Italy, 1988–90



(b) Number of products sold, 1988–90



Source: Nomos Ricera.

In 1990 the Italian CASE market was affected by the following:

- The Ad/Cycle announcement by IBM brought uncertainty and discouraged investments in software engineering;
- Italian users lacked knowledge of software quality and engineering.
- The major suppliers found it difficult to find and apply new marketing techniques for CASE products and solutions.

The users' general interest in CASE tools was the reason for the growth in the number of packages sold and in revenues. However, the growth of revenues was not accompanied by an increase in market penetration or the actual use of packages, mainly because of:

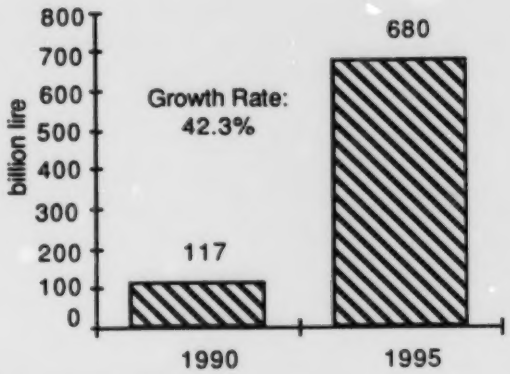
- persistent user scepticism and lack of information;
- the high cost of investments;
- a lack of integrated CASE products;
- a lack of reliable suppliers, which often resulted in unskilled users buying products unsuitable for their needs.

The situation will change only through:

- an in-depth reorganization of users' software development projects;
- a greater supply of not only CASE products but also pre-and post-sale services.

The major operators think that while the positive trend in CASE sales will continue (see Figure 6), the actual use of installed tools will have a limited growth rate.

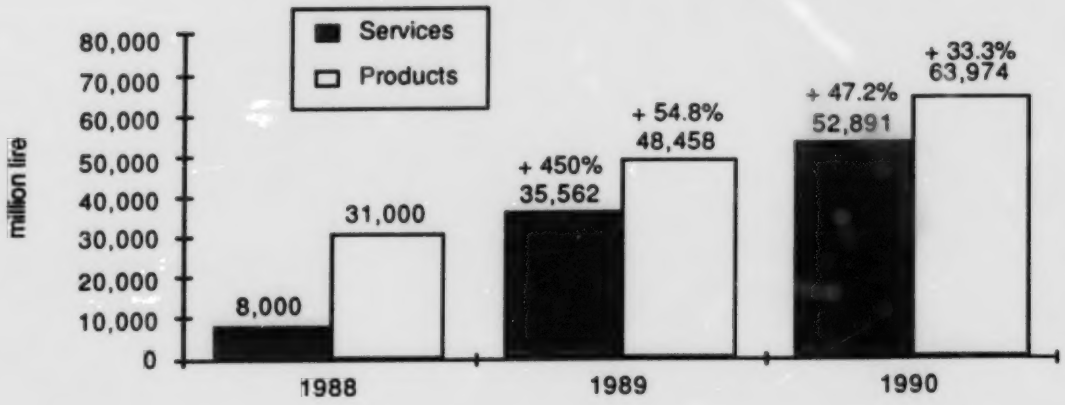
Figure 6
Forecast of Italian CASE market up to 1995



Source: Nomos Ricerca.

The need to reorganize users' structures to successfully use CASE tools and technologies has increased the demand for services, which now contribute almost 50% of the total revenues (see Figure 7).

Figure 7
Italian CASE market for products and services, 1988–90



Italian companies (mainly small- to medium-sized, with EDP centres of up to 10 people) represent a strong market for CASE tools, but this market is difficult to penetrate.

All operators in the CASE market agree that there are two main business sectors (see Figure 8):

- ***information systems*** (see Figure 9), in which CASE tools are used to improve the efficiency of commercial organizations (70% of CASE market revenues); and
- ***realtime systems*** (see Figure 10), in which CASE tools are used to facilitate the production of software, an integral part of industrial production.

Realtime systems differ from information systems in:

- the necessity to respect time constraints and strict efficiency requirements; and
- the dependance on the hardware on which they are developed.

Consequently:

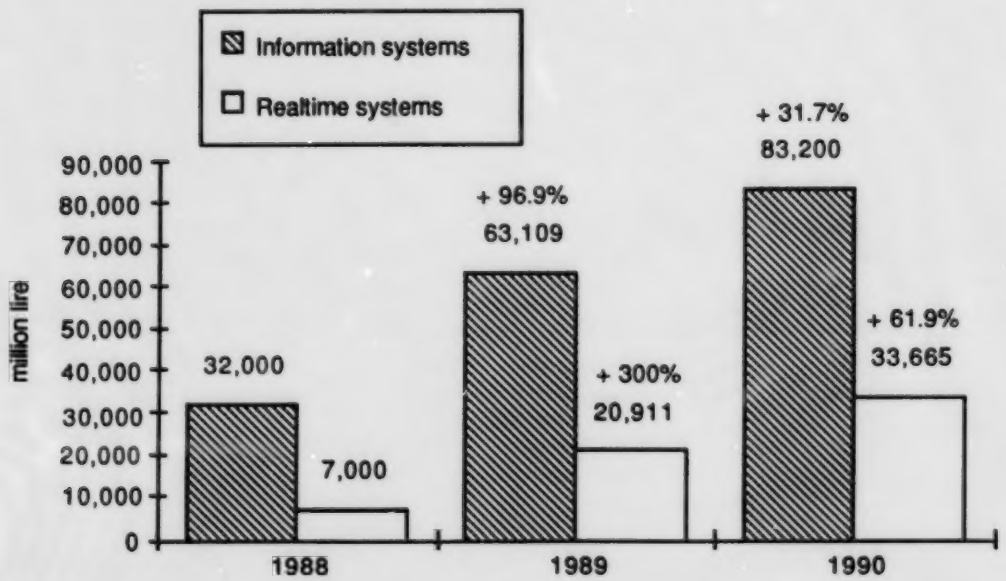
- Realtime systems have a greater need for integrated CASE packages than information systems do.
- People working in realtime systems are more sensitive to problems of quality and software engineering.
- Services are more important than products in the realtime systems market (unlike the situation in the information systems market) because of the amount of planning and consulting necessary for a successful installation.

As a consequence of these differences between realtime and information systems, realtime systems are expected to experience higher growth rates in the Italian CASE market than information systems (see Figure 11).

3.3 Major Competitors

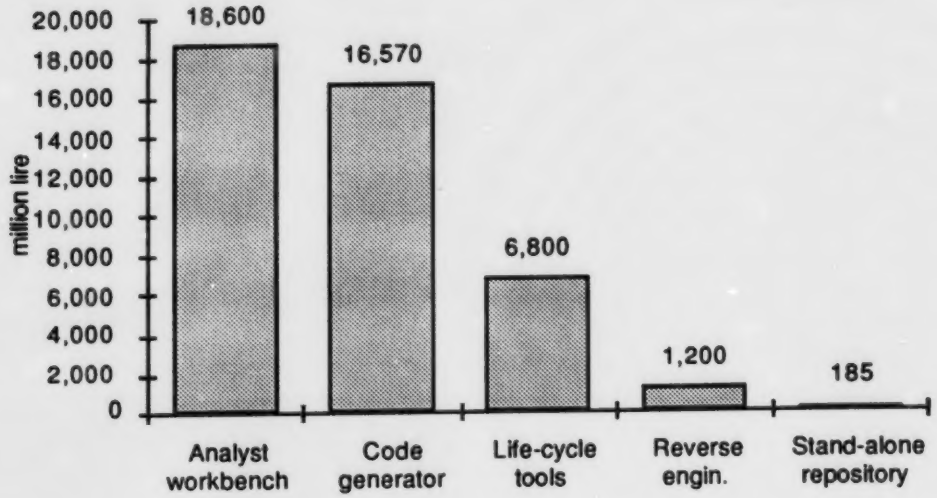
During the last three years the CASE supply market has been changing from one dominated by Italian software houses, each one with its own structure, to one dominated by agencies and distributors of foreign products that generally conform to hardware vendors' specifications (see Figure 12 and Table 6).

Figure 8
CASE market by operational environment



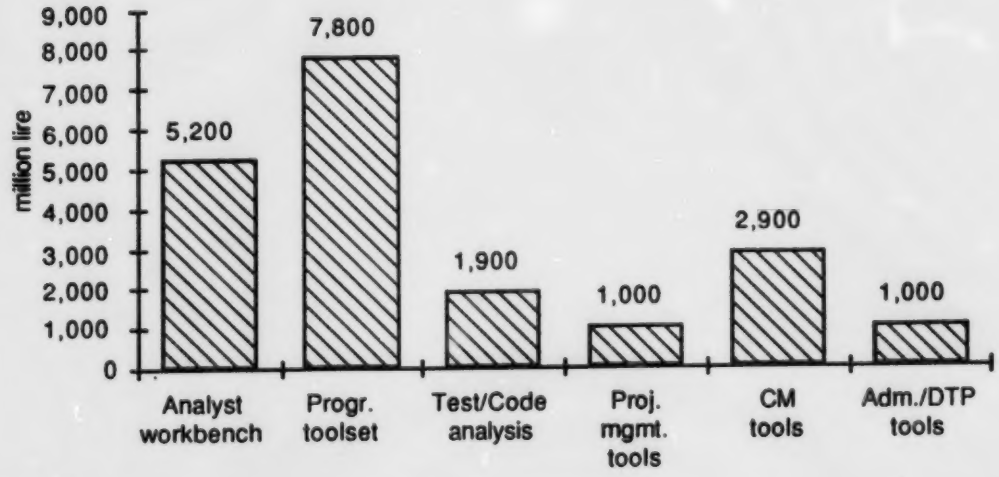
Source: Nomos Ricerca

Figure 9
Expenditure by CASE tools: information systems, 1990
(million Italian lire)



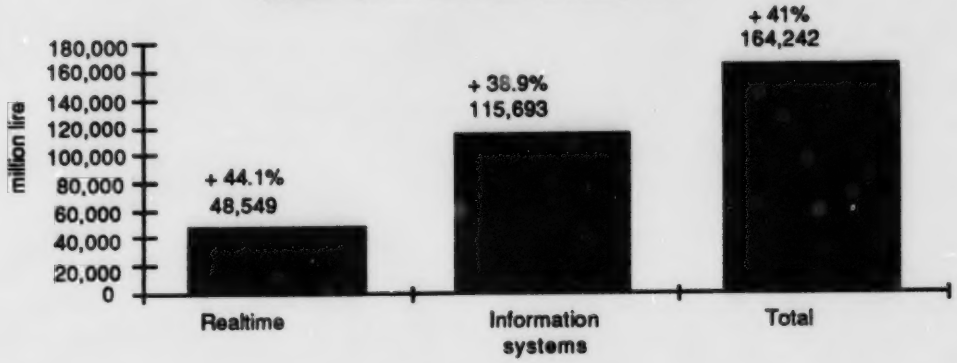
Source: Nomos Ricerca.

Figure 10
Expenditure by CASE tools: realtime systems, 1990
(million Italian lire)



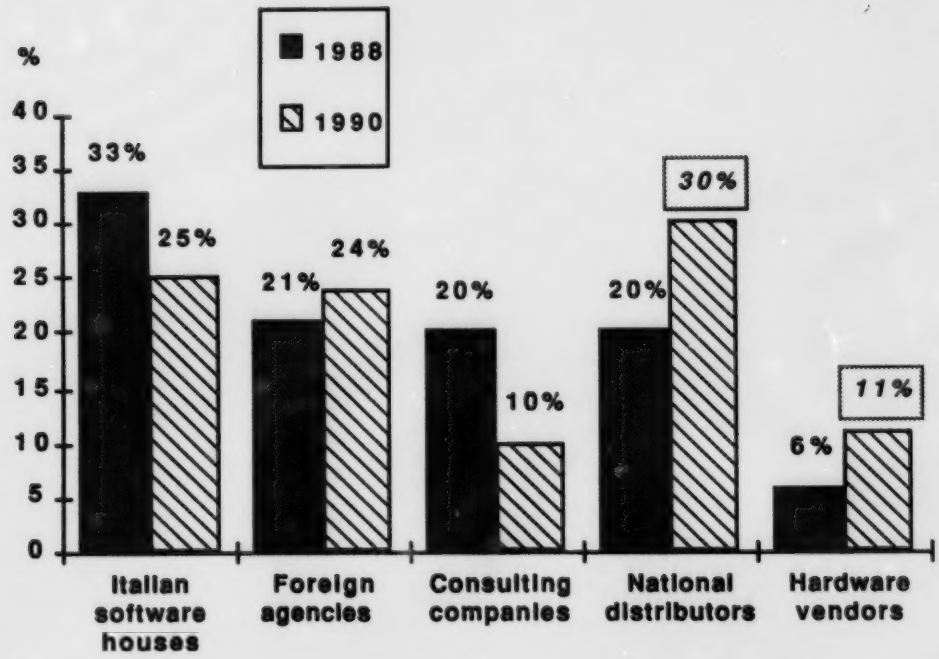
Source: Nomos Ricerca
Note: CM CASE management
DTP desktop publishing

Figure 11
Italian CASE market: forecast, 1991



Source: Nomos Ricerca.

Figure 12
CASE revenues by type of operator, 1988–90



Source: Nomos Ricerca.

Table 6
Major competitors in CASE market in Italy, 1990

Information systems	
Company name	**Company activity**
Andersen Consulting	Consulting
Arthur Young	Consulting
Bachman	Agency
Bull	HW
CGI Informatica	Agency
Formula	Distributor
CSM Soluzioni SW S.r.l.	SW-HS
Engineering	Distributor
Fidia Sistemi S.r.l.	Distributor
Gamma International	Consulting
GESI	SW-HS
GSO	SW-HS
IBM	HW
Italsiel	SW-HS
JMA	Agency
Logo Sistemi	SW-HS
O' Packages	SW-HS
On-line SW	Agency
Pansophic Italia	Agency
Philips SPA	Distributor
Progress - DMW	Distributor
Selesta	Distributor
Siemens Data	HW
Softlab	Agency
Software AG	Agency
Syntax, OIS	SW-HW
Uniteam	Distributor
Wang	HW
West 80	Distributor

Realtime systems	
Company name	**Company typology**
Artis	SW-HS
Datamat	Distributor
DEC	HW
Etnoteam	SW-HS
Hewlett-Packard/Apollo	HW
Instrumatic S.r.l.	Distributor
Intecs	SW-HS
Mentor Graphics	Agency
Mesarteam	Distributor
Summa Sistemi	Distributor
Sysdata Gruppo S.p.A.	Distributor
Systems Designers	SW-HS
Unisys	HW

Source: Monos Ricerca.
Notes: HW hardware
HS house
SW software

3.4 Major Customers

The main market sectors where CASE tools are very successful (see Figure 13) are:

- Industry. Large companies with EDP centres of at least 10 people need CASE products and facilitate their introduction.

- Services. This segment includes all software houses that develop software for end-users and consequently need CASE to improve their productivity.

CASE tools are used by producers of software, both for internal use and for sale to third parties. Users are characterized by their operating environment:

- Those who produce information systems are generally companies with:
  - EDP centres of about 28 people (analysts, programmers, project managers);
  - mainframe hardware platforms (mainly IBM 3090 for MVS) and MS-DOS PCs.

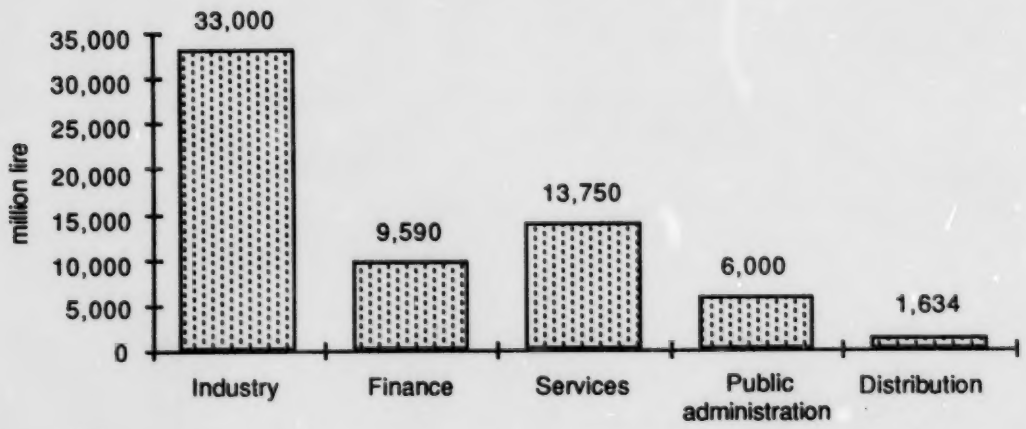
- Those who operate realtime systems are generally industries with:
  - EDP centres of about 14 people;
  - midrange systems and workstation hardware platforms (mainly Digital for MVS and Hewlett-Packard for UNIX) and MS-DOS PCs.

Figure 14 shows the projected investments in CASE for 1991 by the industry and services sectors.

Approximately 13% of Italian companies able to install CASE tools have invested in them: of the 5,000 companies in Italy with an autonomous EDP centre, 650 have installed at least one CASE tool. However, not all users have the same degree of experience (see Figure 15).

Users are very sensitive to problems of quality and efficiency in software development and believe that great benefits may derive from CASE (see Figure 16).

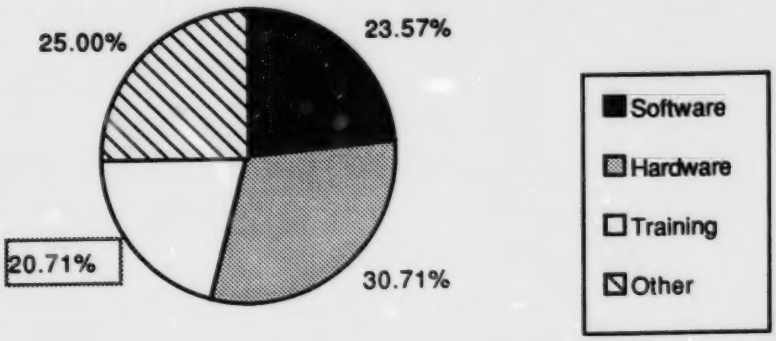
Figure 13
Expenditure on CASE products by market segment, 1990



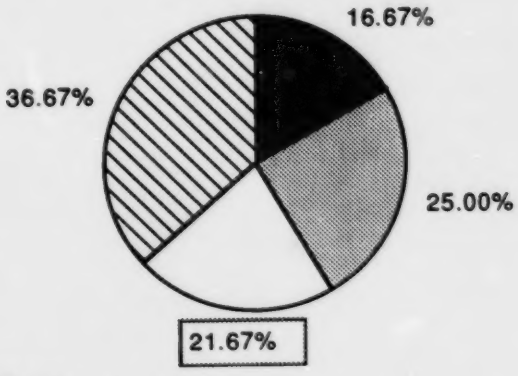
Source: Nomos Ricerca.

Figure 14

(a) Projected investments in CASE by the industry sector, 1991



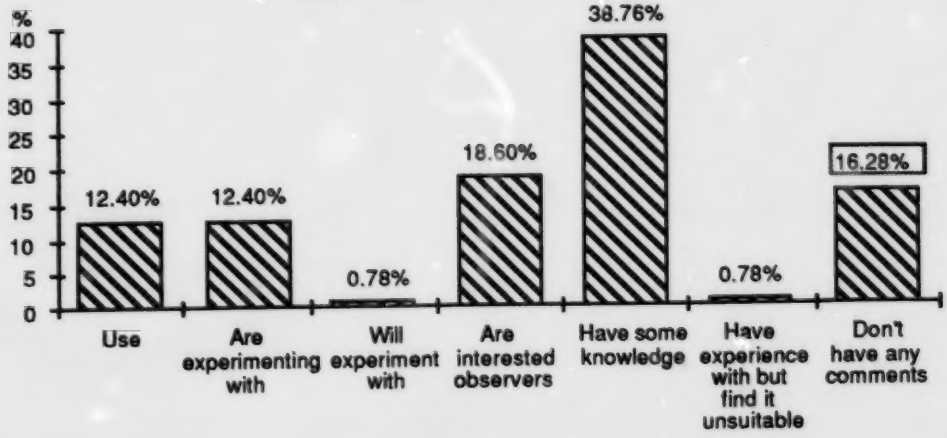
(b) Projected investments in CASE by the services sector, 1991



Source: Nomos Ricerca.

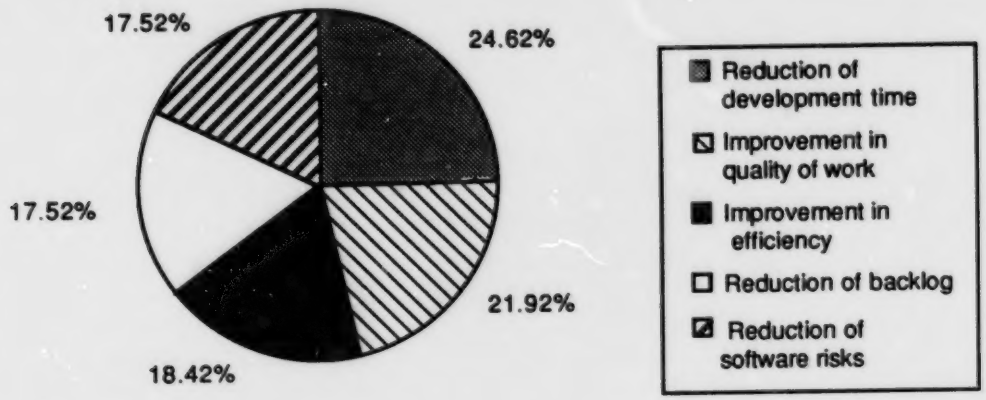
Figure 15

Users' experience with CASE



Source: Nomos Ricerca.

Figure 16
Main benefits derived from CASE, according to users



Source: Nomos Ricerca.

However, some users are dissatisfied with CASE (see Figure 17). In most cases, users' dissatisfaction is the result of inadequate pre- and post-sale service by the supplier.

The need to adopt new organizational structures with more professional and productive people in EDP centres is largely responsible for delays in investment in this area. Other reasons for the reluctance to invest in CASE are shown in Figure 18.

3.5 Market Opportunities

To increase their own market share, major operators should offer the following:

- integrated products that conform to standards and support the users throughout the software life cycle;
- global services (pre- and post-sale consulting, assistance and training); and
- ideas on CASE methodologies and the techniques necessary to create a new culture.

3.6 Promotion

Because potential users find it difficult to assess the benefits of CASE tools and solutions, CASE suppliers should also:

- establish relationships with sponsors and professionals inside customers' organizations, to influence the decision makers; and
- include pilot projects as part of the offer, to give a good impression.

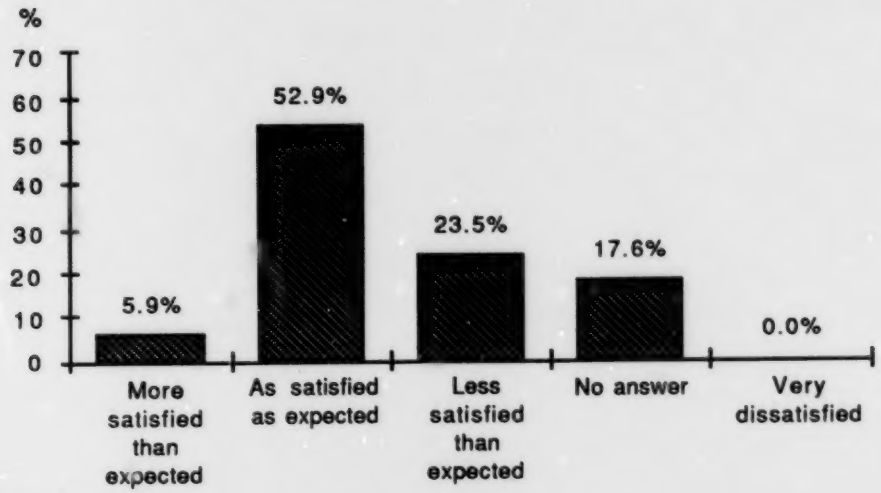
To contribute to the spread of CASE culture, advertising is necessary:

- Most players invest in meetings, public events and publication in specialized IT magazines.
- Major players also advertise in general magazines.
- "Software Quality Control," the most highly regarded Italian convention featuring software quality, draws 4,000 visitors each year (first year: 1987).

3.7 Market Peculiarities

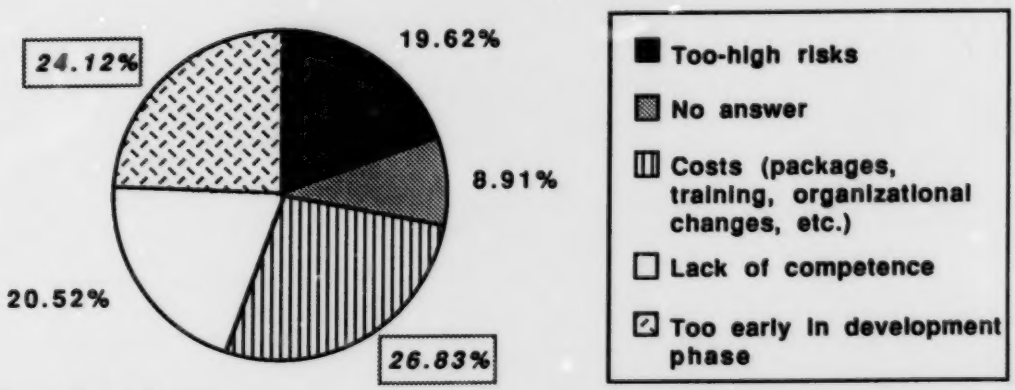
Figure 19 illustrates the peculiarities of the CASE market.

Figure 17
Level of satisfaction among users



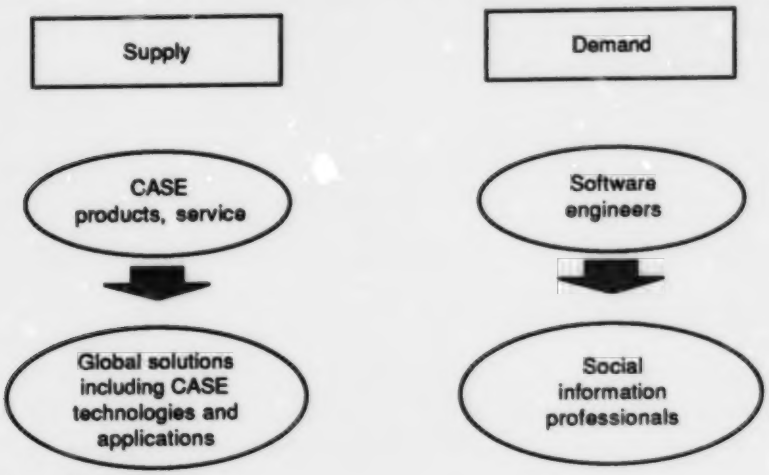
Source: Nomos Ricerca.

Figure 18
Main reasons for reluctance to use CASE



Source: Nomos Ricerca.

Figure 19
Profile of the CASE market



Source: Nomos Ricerca.

4. OBJECT-ORIENTED PROGRAMMING

4.1 Definition

OOP. A methodology that covers all phases of application development, from the analysis to software production to management, using the concept of objects.

OOP products are development tools (compilers, libraries) and languages useful to software programmers.

They can be applied to projects of any size.

4.2 Market Size and Trend

The Italian OOP market in 1990 amounted to 1.5 billion lire for the products and 4 billion lire including services.

Over the next three years, market values are expected to increase at an annual growth rate of 100% to 150%.

In these three years, OOP culture should spread, and the use of products should be consolidated.

The Object Management Group is responsible for defining the standard methodology for OOP technology. This group will decide on the standard in December 1991. The contenders are HP-SUN and Digital.

4.3 Major Competitors

Table 7 lists the major players in the OOP market, their products and their revenues for 1990.

4.4 Major Customers

The OOP market in Italy is presently:

- 60% large companies (Olivetti, IBM, Bull, Italsiel, FIAT, others);
- 5% medium-sized companies; and
- 35% small companies.

Medium-sized companies, presently buying only specific products (e.g., CAD/CAM), are a potential market for OOP tools. However, the spread of OOP in these companies is expected to be slow.

4.5 Market Peculiarities

The OOP market suffers from a high degree of program piracy within the large user companies. This phenomenon and the resistance to change, typical of the Italian market, are responsible for poor revenues in comparison with other European countries:

- Germany is 40-50 times the size of the Italian market.
- France is 20-30 times the size of the Italian market.

Table 7
Major competitors in OOP market in Italy, 1990

Companies	Activity	Revenues (million lire)
Inferentia	Consulting	350
	Distribution of compilers	100
	Distribution of libraries	200
	Courses	300
Borland	Distribution of compilers	Some 100s
S&M	Distribution; consulting	<100
Delphi	Consulting; products on UNIX workstations	<50
Instrumatic	Distribution of compilers	<50
AIS	Distribution	~50
Edor	Distribution of administration applications; consulting	<50
Others	Distribution	<50

Source: Nomos Ricerca.
Note: S&M System & Management

5. FOURTH-GENERATION LANGUAGES (4GL) AND DATABASE MANAGEMENT SYSTEMS (DBMS)

5.1 Definition

4GL. A development language or environment used to quickly and easily create database applications (e.g., useful for an administration manager who needs to produce consolidated balances in a number of different ways).

DBMS. Systems that:

- provide general and specific methods to access and modify integrated data archives through user-friendly procedures;
- guarantee logical and physical data independence;
- guarantee data security;
- guarantee data integrity;
- control concurrent data use; and
- restore the correct state of databases.

5.2 Market Size and Growth

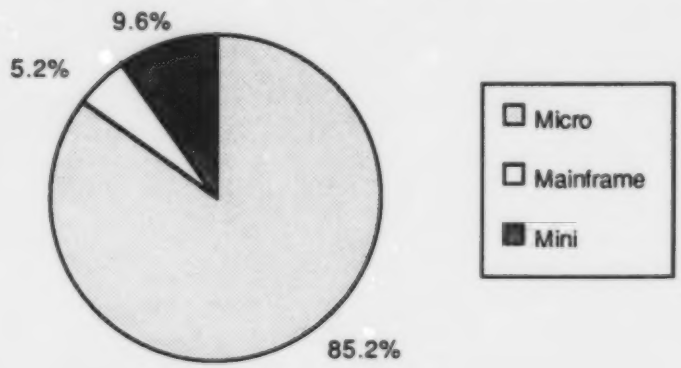
The 4GL-DBMS market in Italy is an oligopoly — there are only a few foreign products, which are very well known and regarded by both actual and potential users.

In 1989, 16,600 DBMS units were sold in Italy (see Figure 20). In 1990, revenues in this market amounted to about 85 billion lire (our estimate is based on data provided by major players) and should approach 100 billion lire by the end of 1991. The Unix 4GL-DBMS market in 1990 reached U.S. $38.8 million and is expected to reach U.S. $60 million by the end of 1991.

In the future the scenario is not expected to change:

- The main products will continue to dominate the market.
- Customers who have already chosen a DBMS will seldom opt for a change; they would rather wait for improvements to existing products (e.g., greater portability).
- New large customers will choose well-known and widely installed products.
- Only some individual customers will choose new products to satisfy their own specialized needs.

Figure 20
DBMS sales in Italy by system category, 1989



Total number of units = 16,600

Source: IDC Italia.

5.3 Major Competitors

The 4GL-DBMS market is dominated by Oracle (more than 60%), Informix, Sybase and Ingres. Ten other products in the market have annual revenues of less than 50 million lire each (e.g., MDBS, distributed by Softcom Cartegini; Gupta, distributed by System & Management).

5.3.1 Oracle

In Italy the name Oracle is associated with Datamat, which has a division specifically dedicated to the distribution of this product (Technology Products Division) (see Figure 21).

In Italy, Oracle currently has 3,344 installations, with a total value of 130 billion lire (70% are also under maintenance contracts).

Datamat concluded a joint venture with Olivetti to offer Oracle on mainframe systems. For this segment of the market, Oracle's direct competitors are:

- IBM (DB2, IMS, SQLDS);
- SAG (ADABAS);
- CULLINET (IDMS); and
- CINCOM.

Most of the Oracle installations are in the DEC-UNIX sector:

- In the DEC market, Oracle's major competitor is Ingres.
- In the UNIX market, Oracle's major competitor is Informix.

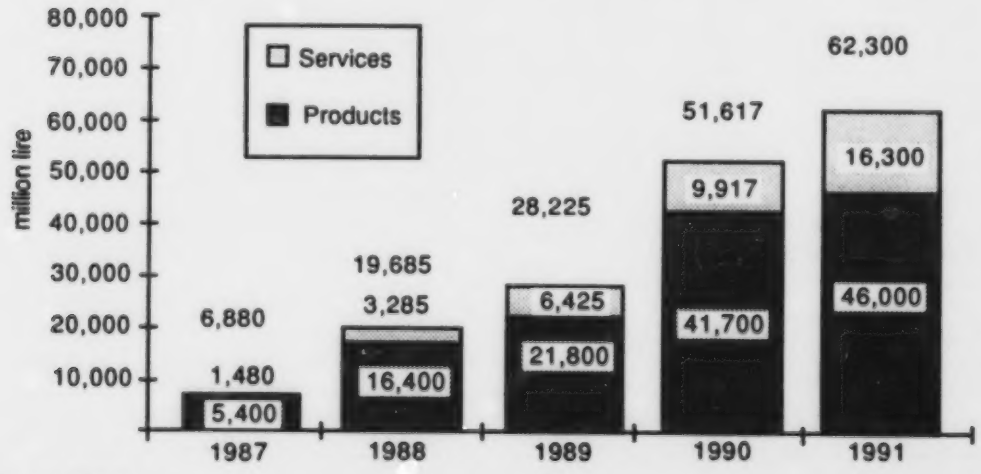
Oracle tools are already operating in AS/400 systems. Oracle's objective is to make the tools operate on different databases: DB2 will be the first one.

Datamat is successful because it offers global support. In fact, Datamat is dedicated to:

- marketing;
- pre-sale service;
- customer support (hot line);
- technical assistance;
- specialized consulting;
- technical account management; and
- training.

Datamat is an exclusive distributor of Oracle for some computers. For all the others, Oracle has an agreement with hardware vendors (Bull, Unisys, Olivetti) and is developing partnerships with Hewlett-Packard and Sun. The majority of customers see Oracle as a valid product and Datamat as a reliable supplier.

Figure 21
Revenues of the Technology Products Division of Datamat, 1987-91



Source: Datamat.

5.3.2 Informix

Informix sales amounted to U.S. $1.4 million in 1990 and are expected to reach U.S. $4.5 million by the end of 1991 (Informix estimate). Informix Italia was founded in 1990 to deal directly with new large customers.

Revenues are almost entirely from products: service revenue is very limited.

Fifty percent of the total business volume is through distributors:
- System & Management (since 1984);
- ESA (since 1988); and
- STRHOLD (also distributes SCO and Lotus products).

Thirty-five percent of the total business volume is through value-added retailers (VARs) and value-added distributors (VADs): 10 software houses have a licence from Informix and integrate Informix software with their own application products.

Among these software houses are:
- SMC (has 100 employees; also sells imaging products);
- CSP; and
- Data Consult (integrates Informix with Magia).

Fifteen percent of the total business volume is done by agreement with original equipment manufacturers (OEMs):
- Olivetti (agreement already signed); and
- Hewlett-Packard (agreement to be signed).

5.3.3 Sybase

Sybase Products Italy was founded in April 1990 and is the only distributor of Sybase.

Sybase revenues amounted to U.S. $0.5 million in 1990 and are expected to reach U.S. $2 million by the end of 1991 (Sybase estimate).

Sybase only distributes the product: it does not supply support services.

Sybase is oriented much more toward regional database management systems (RDBMS) than toward front-end products.

5.3.4 Ingres

In 1990 Ingres opened its first agency in Italy.

Its revenues amounted to U.S. $3.5 million in 1991 (business year ending in June 1991) and are expected to reach U.S. $5 million by the end of June 1992 (estimate by Ingres Italia).

Ingres has about 400 installations and has used all available channels to sell its product:
- distributors;
- VARs;
- OEMs; and
- system integrators.

In the future Ingres will continue to work with third parties (e.g., Mesarteam) and hardware vendors.

5.3.5 PC Competitors

The major PC competitors in the Italian DBMS market are the same as in the rest of the world (see Figure 22 and Table 8).

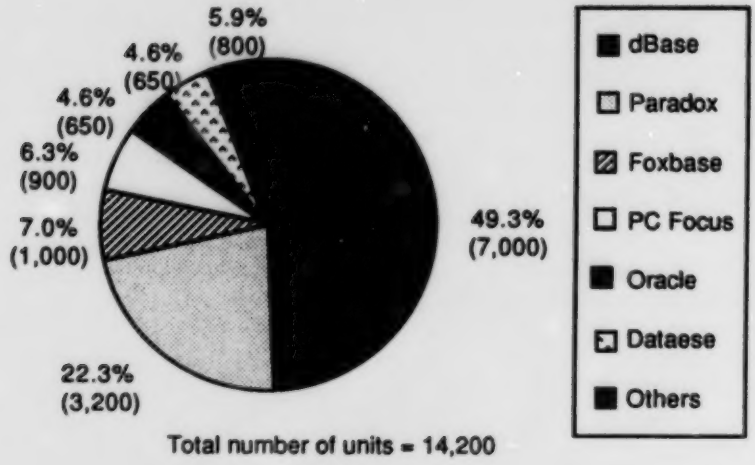
5.4 Major Customers

5.4.1 Oracle

Some of the 1350 Datamat customers are:
- SIP (post and telecommunications public utility company; has invested about 8 billion lire in Oracle);
- national railway (public transportation);
- Ministry of Finance;
- Ministry of Defence;
- Ministry of Health;
- Italcable (telecommunication industry);
- Italtel (telecommunication industry);
- Banca d'Italia (main Italian bank; has invested of about 5 billion lire in Oracle);
- Banca Popolare di Bergamo (bank); and
- S. Paolo (bank).

With these customers a prepayment system is applied: customers purchase credits, and when the package is installed the amount is deducted from the credit.

Figure 22
PC competitors in the DBMS market in Italy, 1989



Source: IDC Italia.

Table 8
PC DBMS packages available in Italy

Package	Distributor	Producer
Dataese	Sisoft	Dataese
Dataflex	Lan System	Data Access
DataPerfect	Sisoft	WordPerfect
dBase IV	EIS	Ashton-Tate
File	Delta	Microsoft
File Maker	Elcom	Claris
Fox Base	EIS	SCO
Fox Pro	EIS	Fox Software
Informix	ESA, S&M	Informix
Ingres	Mesarteam	Ingres
Omnis 5	Apice	Blyth
Omnis Mac	Apice	Blyth
Oracle	Datamat	Oracle
OS/2 Database Manager	IBM	IBM
Paradox	Edia Borland	Borland
PC Focus	Software Technology	Information Builders
R: Base	SEC	Microrim
Super DB Plus	C.A.	C.A.
SQL/Server	Microsoft	Sybase and Microsoft
4th Dimension	Softinnova	ACI

Source: KPMG Regis McKenna Italia.
Note: S&M System & Management

As well as with direct customers, Datamat works with well-regarded software houses, which operate as VARs, developing applications on Oracle technologies. These software houses include:

- CAP Gemini;
- Etnoteam;
- Data Base Informatica;
- Mesarteam;
- Atropo; and
- Axioma.

The main sectors where Oracle is installed are:

- public administration (projects developed with Lombardia Informatica, Italsiel, CSI Piemonte, Data Processing, Celcoop);
- large industries (agreements signed with STET, ENI, Ferruzzi group); and
- telecommunications (SIP installed many packages, and an increased need for DBMS in 1992 is expected).

To date banks and insurance companies have been using IBM DB2, but Oracle has just signed an agreement with Olivetti to enter this specific market.

Foreign insurance companies and credit agencies (e.g., Commercial Union, Munkener) that are opening branches in Italy and have heterogeneous hardware platforms (not necessarily IBM) are potential Oracle customers.

5.4.2 Informix

Informix customers are mainly contacted by distributors — VARs, VADs and OEMs — as Informix Italia does not normally contact customers directly.

However, Informix Italia has signed agreements with some major customers, who acquire the master copy and then make reproductions to distribute within their own structures. These accounts are mainly within the public sector and are:

- Regione Veneto;
- Ministry of Defence;
- episcopal Italian entity; and
- Ministry of the Interior.

A new agreement will be signed with FIAT.

5.4.3 Sybase

Sybase has about 50 customers, including a number of software houses.

These are:

- Credito Italiano (selected Sybase over Oracle in August 1990);
- Fatme-Ericcson group (two projects with SIP as final users: hot billing of mobile phones, and switchboard integration);
- Data Base Informatica (Sybase VAR for hospital automation);
- Ilva group;
- IBM Semea (Sybase used to implement just-in-time); and
- Unisys (Sybase VAR for Sole 24 newspaper project).

5.4.4 Ingres

Ingres is targeted at customers in different sectors, with the greatest penetration in medium-sized industrial companies.

Installations include:

- SGS Thomson (electronics);
- L'Oréal (cosmetics and pharmaceuticals);
- Agip (oil);
- Nuovo Pignone (mechanicals);
- Elsag (mechanical);
- La Fondiaria (insurance);
- Akros (finance);
- United Nations Food and Agricultural Organization;
- Valeo (mechanical);
- Cselt (telecommunications and electronics research);
- University of Milan;
  and
- University of Turin.

5.5 Market Opportunities

The 4GL-DBMS market offers limited entry opportunities because of the presence of well-consolidated products and well-regarded distributors.

Customers know of Oracle and Informix, and it is difficult for suppliers of other products to enter the market.

Customers that might be convinced to adopt new DBMS are small software houses with very specific technological needs not being met by the major products. These niches are small. Successful marketing to these software houses will be difficult, so firms intending to do so should evaluate their investments carefully.

Another way to penetrate the market could be to supply 4GL that allows the development of applications for different databases installed in large companies, thus helping customers avoid substitution and conversion problems. To date in Italy, no suppliers have offered such solutions.

5.6 Promotion and Opinion Makers

The only Italian magazine that is dedicated to 4GL-DBMS is *Punto Erre*, a Codd & Date publication.

At the European level there is an English monthly magazine, RDBR, which has a very good reputation.

Because of the oligopoly that characterizes the 4GL-DBMS market, the only opinion makers are major distributors of consolidated products.

In Italy there are no well-known people who are devoted to the study of DBMS and form their own opinions.

There are no regular Italian conventions exclusively dedicated to 4GL-DBMS; only Datamat organizes demonstrations and meetings for actual and potential customers.

6. GEOGRAPHIC INFORMATION SYSTEMS (GIS)

6.1 Definition

GIS. Systems that create, treat and analyse geographically referenced information by mapping outputs with interactive graphic capabilities.

Such systems create a special user environment for geoprocessing needs by visualizing, querying and analysing geographic information.

Such systems normally:
- display and manage raster images;
- manage vector data;
- handle tabular data from external DBMS;
- manage survey data; and
- process surface data.

Major GIS have embedded cartographic production tools for display screens and hardcopy outputs. GIS are integrated systems connected to input peripherals such as high-precision scanners and digitizers and to output peripherals such as electrostatic plotters and thermic printers. It is not unusual to support GIS through massive memories such as optical disks or tape units.

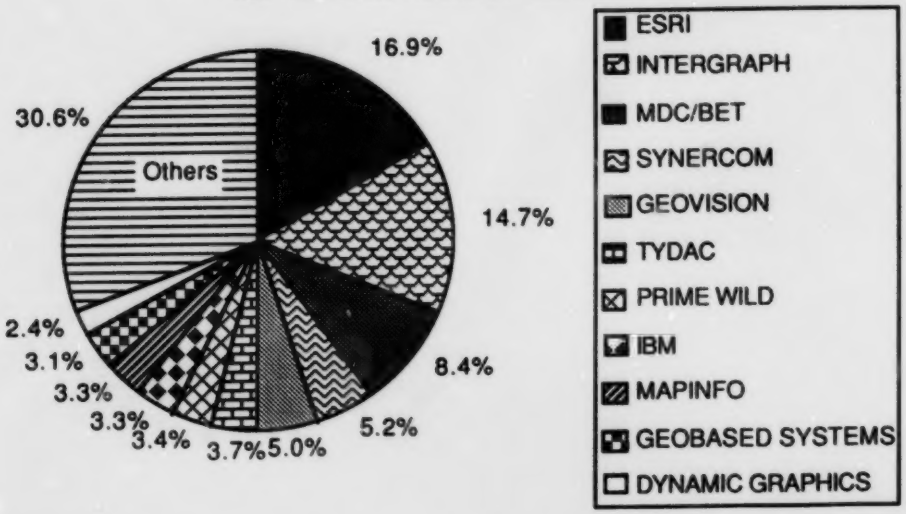
Major applications of GIS are related to:
- general mapping;
- surface analysis (including 3D);
- management of technological networks (gas and water pipelines, electricity, etc.);
- management of communication networks (e.g., highways and railways); and
- analysis of almost all geographically referenced information.

GIS is a sub-niche of what the Italian players call Sistema Informativo Territoriale (SIT). SIT includes all the geographically related information that can be managed through IT systems. The monitoring of groundwater security, for example, even if not directly linked to GIS, is included in the wider area of SIT. However, the distinction between GIS and SIT is blurred.

6.2 Market Size and Growth

Completely reliable data on the size of the Italian GIS market are not available. However, major industry players have made their own estimates: the Italian market for GIS is approximately 100 billion lire (U.S. $805,152). The market grew by 17% to 20% in 1990. This compares with a worldwide market for GIS systems — including software, hardware and services — of U.S. $612 million in 1989. Worldwide GIS software sales were over U.S. $203 million, 32% more than in 1988 (see Figure 23).

Figure 23
GIS worldwide software market, 1989



Source: Datatech, Inc.

6.3 Major Competitors

Major worldwide GIS vendors, such as ESRI, Intergraph and Prime, are also the major players in the Italian GIS field.

Table A7 in the Appendix lists the major products and vendors in the Italian GIS market.

The supply side is dominated by foreign players who distribute their core product on the Italian market.

Most of them have established their own sales networks (Intergraph, Prime, Unisys, McDonnell Douglas, Syscan). Other players prefer to be supported by Italian distributors (ESRI, Csh, Ifm Infomaster), which can provide not only the sales force but also all technical assistance, including feasibility studies, database construction, implementation and systems maintenance. Thus, pure distribution activities have to be compared with the typical VAS activities.

The major players can be split into three major categories: the market leader, the followers and the outsiders. The market leader is ESRI Italia, the followers are Prime, Intergraph and Siemens, and the outsiders are Italcad and Gepin.

6.3.1 ESRI Italia S.p.A.

ESRI Italia is a joint venture between the state-owned Telespazio and ESRI Inc. (Environmental System Research Institute) of California. The company, based in Rome, started in 1990 with a staff of 40 people (30 technicians and five salespeople), continuing the five-year activities of Telespazio in the exclusive distribution of ESRI's product line (based on the Arc/Info kernel) for the Italian market. The Managing Director of ESRI is Mr. Sandro Gizzi.

Arc/Info is the most frequently installed GIS on the Italian market. The product is well known all over the world. Italians appreciate the reliability of the software and the service of ESRI's staff. One of ESRI's most important projects is "Atlas," a project for art conservation. The customer is the Ministry of Culture. This project is scheduled to take 450 person-years.

6.3.2 Prime Computervision

Prime Computervision is the second largest GIS vendor on the Italian market. With more than 20 installations of its main product line, System 9, Prime has consolidated its position through its considerable resources. An advantage of Prime, compared with its competitors, is that its product may be integrated with all the best-regarded 4GL databases (Oracle, Ingres and Informix).

6.3.3 Siemens Data

The Italian subsidiary of the German company provides special GIS applications for its proprietary system, Bs2000, in more than 30 installations throughout Italy. The name of the product line is Sicad. The target customers are end-users who have already installed Siemens operating systems. Italian municipalities and some important ministries (Ministry of the Environment, Ministry of Civil Defence) have chosen the Siemens environment for their IT systems.

6.3.4 Intergraph

This U.S. company has a very good reputation in the Italian GIS market. The firm is able to provide GIS for both workstations and PCs. This ensures wider coverage of the customer's needs. A characteristic of Intergraph's market position is that it has established a strong presence in the smaller companies as well as in mid-sized companies.

6.3.5 Italcad

Italcad, a state-owned company belonging to the Alenia Group (the Selenia-Aeritalia joint venture) is the major fully Italian GIS vendor. The whole product line is based on Auto-troll's Serie 5000, a U.S. solution distributed and adapted for the Italian market by Italcad. It is a well-known product with a well-consolidated installation base (more than 15 installations). Other important Italian GIS vendors are Gepin (with Geigs) and CSI Piemonte.

6.3.6 IBM

IBM does not play the role it has in other major foreign GIS markets. The IBM product line is still focused on large machines (mainframes), and IBM is still trying to launch the workstation and PC product line.

6.3.7 Minor Software Houses

Apart from major GIS players, the supply side is still fragmented. Small software houses try to exploit their small market niches, involving in most cases single projects executed for small, local public entities. The number of small GIS software houses in Italy is not mentioned in official statistics. Major players estimate that there are at least 100.

Despite the predominance of foreign product lines, Italian expertise in providing GIS services (implementation, construction of databases, maintenance and assistance) is considered very high.

The public sector's involvement in large geographical and mapping projects led the major competitors to form ad hoc consortia to participate in large project tenders. These consortia are usually organized by a main contractor, who can be a system integrator or a large hardware firm supported by specialized GIS software houses or VARs as subcontractors. Regional consulting and general software firms that have easier access to the municipalities or to local decision centres often join these consortia.

Political and other lobbying interests play a major role in the assignments of contracts. The involvement of the GIS software house in the political decision process is not as important as that of the main contractor. Technical capabilities and the quality of the product are still the most important elements in the assignment of contracts.

GIS vendors not only have to provide products but also must be able to assist the client in all the implementation steps required to ensure the success of the whole project. Revenues from a standard GIS project are typically 80% for services and 20% for product supply. The largest aspects of the support service are data entry and the digitization of information. The construction of the database is the starting point of a good GIS solution, and GIS vendors have focused their attention on this part of the project. This is a major reason why the personnel of GIS software houses are 70% to 80% technicians and 20% to 30% salespeople.

6.4 Major Customers

GIS customers are mainly the public administration bodies (see Table 9), either central (ministries; central public utilities such as railways and post) or local (regional bodies; municipalities; local public utilities such as transportation and electricity). The whole Italian mapping system is considered outdated. Therefore, large upgrading projects have to be planned.

Mapping projects can involve:
- the railway systems;
- the population census;
- the cadaster (land registry);
- the highway network;
- the utilities' pipelines and networks;
- the artistic monuments registry and mapping system;
- the environment organization and security systems; and
- the telephone network.

The most important project, however, is related to the national geographic system, which has to be completely updated.

6.4.1 Local Public Administrations

The major entities involved in GIS projects are:

- *Regioni* (such as Regione Lombardia, Regione Lazio). There are 20 regions, each of which implements national projects. Basically, the regions depend on national financial resources, but they have wide autonomy to make expenditure decisions. The political composition of the regional government is determined by regional elections and may therefore be different from the central government's political composition (for example, the Communist party is represented in the Tuscany regional government, whereas no communists are represented in the central government). An important task of the *regioni*

Table 9
Major central public administration entities involved in GIS projects

Entity	Responsibility in GIS projects
• Ministry of the Interior	• National geographical mapping system and the population census
• Ministry of the Environment	• Monitoring of environmental issues such as groundwater control
• Ministry of Finance	• New cadaster systems
• Ministry of Postal Services and Telecommunications connected with the state-owned SIP (national telephone company) and ENEL (public electricity company)	• Telephone and electricity networks and trunk lines
• Ministry of National Treasures	• Catalogue of monuments and art conservation issues
• Ministry of Agriculture and Forestry	• Utilities linked to tourist issues
• Ministry of Tourism and the Arts	• Woodland census, forestry issues and natural resources mapping

is the management of local public health units (the USLs). The USLs manage the parts of the regional budget that deal with local investments and expenditures.

- *Provincie* (such as Provincia di Milano, Provincia di Roma). With smaller territories than regioni, the provincie have less autonomy and financial power. They are often dependent on the political decisions of the regional governments.

- *Comuni* (municipalities such as Milano, Torino, Roma). There are more than 6,000 comuni in Italy. They are gaining more autonomy in taxation issues and expenditure matters. They are in charge of:
  - the organization of urban territory;
  - the public utility programs (local transportation systems); and
  - urban construction and real estate management.

Political characteristics and policies vary from region to region. Consequently, each region assigns projects to its preferred GIS company, either as a main contractor or as a subcontractor.

6.4.2 Public Companies, State-Controlled Industries

In this category there are a number of different types of companies:
- listed companies (e.g., the public holdings like IRI and ENI or the telephone company, SIP);
- central entities without autonomous management (e.g., Ferrovie dello Stato, the Italian railway company); and
- local bodies involved in the public utilities (e.g., ATM, the Milan public transportation company, or a local energy supplier such as AEM, the Milan electric company).

Groups like IRI and ENI have established their own software houses and are therefore reluctant to request external support for GIS implementation. However, private software houses provide kernels (central parts of software) and products to the public software houses.

Entities like Ferrovie dello Stato are, to some extent, more open to private tenders, even though politics and lobbies still play an important role in the award of projects and contracts.

The public utility companies linked to municipalities have much more autonomy. Thus private software houses and foreign suppliers may have easier access to important GIS projects in this sector.

The peculiarities of Italian GIS customers, which include CPA and LPA, are reflected in the attention focused on GIS management issues. IT departments of central and local bodies are technologically weak and usually have to ask for support from external sources.

When involved in GIS projects, customers are less sensitive to time constraints and efficiency requirements. Time frames are therefore flexible. The customers do not make the work schedule a main criterion when judging the suppliers' skills. This issue is extremely important: GIS projects need large volumes of services rather than pure off-the-shelf packages.

Nevertheless, the need to improve the organizational structure of public EDP centres is a main commitment of the public administration sector. There are now regulations for public administration hardware and software systems to be applied by IT suppliers. The final results are not known yet. However, the general recommendation is to adopt the UNIX environment.

Replacing old platforms with UNIX systems will take a long time, and vendors still have opportunities to provide the public administration sector with proprietary systems (such as Siemens or Bull).

In this sector the supplier has the advantage of knowing what is available in the market, whereas the customer tends not to have a detailed knowledge of either the technical aspects of any particular product or the after-sale service and support required. Because the GIS market is relatively young, sales proposals for GIS projects do not follow homogeneous standards for timing, work approach, methodology, prices and service fees.

6.5 Market Opportunities

To increase their own market share, GIS suppliers should offer the following:

- integrated systems that conform to public administration standards and support the end-users throughout the software life cycle;
- global services (feasibility studies, consulting, data retrieval, data entry, file storage and post-sale training); and
- turnkey systems with special hardware and peripherals, allowing the complete operation of GIS.

Major constraints for vendors entering the Italian GIS market are:

- difficulties in establishing long-term relationships with political decision makers, particularly central administration managers;
- difficulties in surviving long-term payments public administration takes between (6 months and 2 years to pay for projects);
- difficulties in assembling large project teams because of high personnel turnover in Italian software houses; and
- a lack of efficient infrastructures to enhance the development of GIS technological and marketing capabilities (associations, specialized press, etc.)

6.6 Promotion and Opinion Makers

The young GIS market in Italy does not yet have an effective infrastructure with opinion makers, specialized press and field associations. There are, however, a number of respected authorities:

6.6.1 Major Opinion Makers and Consultants

- Prof. Mogarivich, University of Pisa;
- Prof. Marescotti, University of Milan; and
- Prof. Pelagatti, University of Bologna.

6.6.2 Major Associations

Specific Italian GIS associations do not exist. Italian players refer to the international AM/FM (Automated Mapping/Facility Management Association). The Italian contact is Mr. Esposito of the municipality of Brescia.

Cispel, although not specifically a GIS association, provides consulting services to public entities through its company Publitecnica. It also offers support in geographical and mapping issues.

Consorzio Proter, a special SIT consortium (discussed at the beginning of the GIS section of this report), provides assistance to customers and GIS vendors. President of this consortium is Mr. Troccoli. An alternative contact is Mr. Raimondi.

7. MULTIMEDIA AND IMAGE-PROCESSING AND GRAPHICS SOFTWARE

7.1 Definition

Multimedia. A new concept that is leading to a new era of information management. Although there is not yet a precise definition of "multimedia" because of the briskness of this young market, multimedia systems can be defined as the set of hardware and software components that allows simultaneous management (capture, processing, storage, reproduction, transfer) of different kinds of information: text, graphics, sound, animation and fixed and moving images.

Image processing. A set of activities that feeds paper documents, microfilms and microfiches into CAD processes to allow the capture, manipulation, archiving, visualization and modification of images.

Graphics. Software developed to create and manage graphics on computers. Operators disagree about whether CAD should be included in this category.

7.2 Multimedia

7.2.1 Market Size and Growth

Table 10 show the value of the multimedia market in Italy for 1989-92.

Table 10
Multimedia systems market in Italy, 1989–92

	Market size (billion (lire)	Growth from previous year (%)
1989	110.7	n.a
1990	175.5	58.5
1991	264.1	50.5
1992	405.6	53.6
1993	595.0	46.7

Source: Olivetti
n.a. = not available
Note: Amounts include hardware, software and services

Table 11 shows the value of the multimedia market in Italy in 1990.

Table 11
Multimedia systems market in Italy by segment, 1990
(billion lire)

Segment	Value	Market Share (%)
Large industries	29.6	16.9
Small and medium industries	7.6	4.3
Large distributors	9.4	5.4
Small and medium distributors	1.4	0.8
Services	37.9	21.6
Credit institutes	25.1	14.3
Insurance and financial companies	22.6	12.9
LPA-Health	10.9	6.2
CPA	30.7	17.5
Families	0.3	0.2
Total	175.5	100.1

Source: Olivetti.
Notes: Amounts include hardware, software and services
CPA central public administration
LPA local public administrations

The multimedia market is a horizontal one involving several sectors and business operators:

- hardware (new computers, input and output equipment, optical disc readers, audio and video equipment);
- software (packages for graphics, audio and text processing); and
- infoware (multimedia products and titles).

Many observers consider multimedia a new business opportunity for hardware sales.

Software programs for media integration and interactivity are gaining in importance.

Infoware is a new area involving two kinds of business operators:

- the audiovisual publisher, who takes care of the start up of the production of multimedia applications and distribution; and
- the multimedia applications author, who coordinates the skilled personnel needed to produce multimedia applications.

7.2.2 Major Competitors

The multimedia market is strongly based on and linked to technology. It is driven by technology suppliers (hardware and electronic components vendors), who were the first to invest in this area some years ago.

The major players are:

Apple. Since it first appeared in 1984, Macintosh has been developed as a multimedia workstation thanks to applications such as Hypercard, Mediamaker, Pagemaker and QuickTime.

In Italy, Apple has created a multimedia organization to conduct basic research in the sector.

Commodore. The first Amiga Commodore, presented in 1985, immediately met great favour in the home computing market.

Today, Amiga 3000 (launched in 1990) and the multimedia author system, Amiga Vision, allow easy and inexpensive development of multimedia applications.

Commodore is mainly targeted at niche markets (sophisticated videos, music, etc.) rather than at volume markets (e.g., information points) or high-turnover markets (e.g., training).

Sony. Since the beginning of the 1980s, Sony and some partners have been developing a product line that has led to the introduction of advanced technologies.

In 1982 Sony and Philips created the Red Book, the book of audio CD, CD-ROM and CD-ROM XA standards.

Sony technologies were used recently to develop applications for the Italian army and for teaching languages.

Philips. Philips has developed a CD-I standard with Sony and is presently offering a line of author systems and products for publishers.

Remote-control devices allow the user of CD-I to connect easily with a TV.

IBM Semea. IBM Semea is working to satisfy different demands for multimedia applications on different platforms (agreement with Intel for DVI).

The agreement with Apple is for the development of multimedia software environments independently from the platforms.

Microsoft. Microsoft was the first company to work for the acknowledgement of a standard for hardware and software multimedia products. It recently announced Multimedia Development Kit, an environment for the development of multimedia applications and products.

Bull Italia. Bull Italia Image Works, based on a client-server structure, is a multimedia system with many installations in different sectors: public administration, credit institutes, industry and service companies.

Applications range from post-registration to files and resolution management (insurance companies, local entities), from scientific and cultural cataloguing (universities, research institutes) to clinical chart-management (hospitals, local health units) and call-management systems (assistance centres in large companies).

Zenith Data Systems Italia. Zenith Data Systems Italia, part of the Bull group, created a benchmark laboratory to test third parties' components and application software for multimedia solutions by applying them to real situations.

The company introduced a number of skill centres in its sales network to assist end-users from the project phase to the development phase and to solve post-development problems.

Olivetti Systems and Networks. More than 70% of Olivetti Systems and Networks' research investment is dedicated to multimedia in the Pisa, Pozzuoli and Cosenza laboratories.

The target is the professional market, for which products are under development. The proposed system is called Open Interactive Multimedia. The application areas are education, interactive information systems, demos, simulations, archiving, entertainment, interpersonal communication and multimedia desktop. Among the developed titles are one for training in banks, one for an airline promotional activity and others for electronic catalogues for museums.

The most significant multimedia projects developed in Italy are:

- the Arianna project for improving the quality of service (Apple Computer-Gruppo Rinascente);
- management of clinical charts (Bull HN Italia-Milan Ospedale Maggiore);
- "Send a Gift," an interactive catalogue (Commodore Italia-Giunti Gruppo Editoriale);
- "Merlin," a tutoring shell for applying information and organizing knowledge (Digital Equipment-Mers);
- "Microsoft Multimedia Beethoven: The Ninth Symphony" (Hitachi Sales Italiana-Microsoft);
- voice recognition for radiology reporting (IBM Semea-S. Raffaele Hospital, Milan);
- a guide to reasoned prescription (Texas Instruments Italia-Medicine Communication);
- a presentation of "Lord Byron" for Hotel Roma (Philips-Sigma Plus);
- a compact catalogue (Sidac-Iveco);
- "Machine Course-Pilot Course-AB Initio Course" (Sony Italy-Agusta);
- "Presentation Marelli Pilot for CNMA Consortium" (Olivetti S&N-Magneti Marelli); and
- management of the scientific library (Bull HN Italia-Milan Ospedale Maggiore).

The multimedia market is still at the pioneer stage; consequently, audiovisual industries, publishers and IT operators are working together to develop this market.

During the next few years, when the market borders become better defined, the present phase of cooperation will change into one of hard competition.

When telecommunications technology allows high-speed networks and reliable VAS, telecommunication operators will also enter the multimedia market as major players.

7.2.3 Major Customers

Of the 2,000 multimedia interactive systems installed in Italy, 60% are used for training and 40% for public information.

The consumer market value is currently around 4 billion lire.

Because of the high cost of multimedia systems and the present economic recession, the only companies that have already invested in multimedia are large companies with financial capabilities and public entities financed by the government.

In the near future, applications for multimedia systems are expected to concentrate on:

- companies' communication and presentation;
- training and professional points;
- public information;
- didactics and personal culture; and
- the home (more intelligent games and a new cultural market).

Major operators agree that the market will initially be developed by large, professional users and that it will take several years for generic users to build the skills to adopt and creatively use the new technologies.

7.2.4 Market Opportunities

In the multimedia market the main operators are seeking a definition of standards (IBM-Apple agreement to compete with Microsoft).

What is really needed is a supply of solutions, and these solutions will soon have to comply with specific, defined standards.

This market offers many opportunities, but because of the confusion that still characterizes this segment, the distribution channels, the best niches and the required products have yet to be identified.

A foreign software company can enter the present market as a subcontractor for projects in which

large customers cooperate with hardware vendors and system integrators, contributing suitable products and software to the required solution.

Cooperation with consulting companies that could offer products or solutions by foreign software companies might be profitable, even though in Italy, at present, it is more difficult to find consulting companies involved in the multimedia market than it is to find hardware vendors, publishers and media operators.

7.2.5 Promotion and Opinion Makers

At the last SMAU convention (the most relevant annual convention in Italy where new hardware and software solutions are shown), the "New Media" section was dedicated to multimedia: new technologies and the first applications were presented.

Magazines that deal with multimedia are:
- Computer Graphica & Multimedia;
- Creative; and
- Personal Computing Multimedia (published recently for the first time).

The concept of multimedia is spreading so quickly that IT generalist magazines, such as *Computer World Italia* and *PC World*, are dedicating specific sections to this subject.

Major opinion makers in this area are:
- university professors (G. Degli Antoni, Computer Science, University of Milan; G. Tonfoni, University of Bologna; R. Busa, Catholic University of Milan; U. Eco, University of Bologna);
- hardware vendors (Apple, Commodore, Sony, Philips, IBM, Olivetti, Bull, etc.); and
- publishers and media operators (P. Montagna, Commercial Manager of Sonapress/Telemedia Italia; E. Pentiraro, Editel Administrator; G. Giovannini, President of FIEG, the federation of publishers; M. Fichera, General Vice-Director of RAI, the public Italian television network).

7.3 Image Processing

7.3.1 Market Size and Growth

A peculiarity of the Italian image-processing market is that it is largely PC based, mainly because of the structure of the Italian industry.

The market growth is limited in comparison with that in other European countries (U.S.$340 million in France and U.S.$350 million in Britain estimated for 1993) because of:
- the wait for IBM to develop new products, which is more significant in Italy than in other countries; and
- cultural resistance to full acceptance of image technologies.

Despite the use of electronic data processing, more than 90% of business information still circulates on paper.

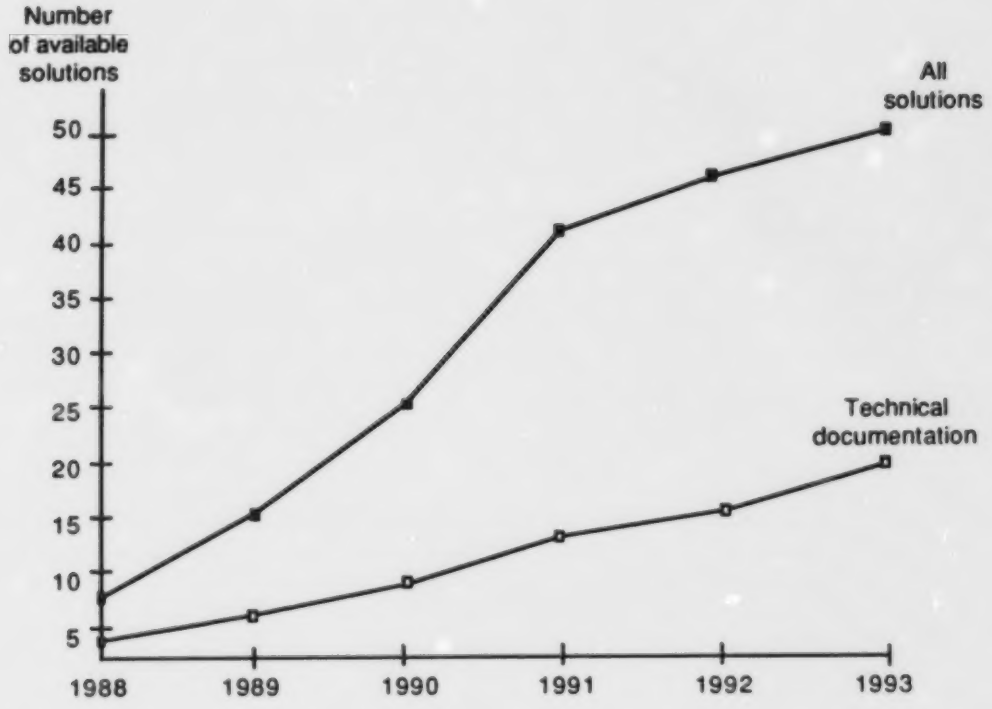
Most of the existing image-processing applications use available technologies to:
- store information characterized by low-frequency updating; and
- store historical information characterized by low-frequency access.

Consequently, retrieval time is shortened and physical space is saved, but daily work is left unchanged.

Figure 24 shows the number of solutions available on the market since 1988 and extrapolated to 1993.

The above-mentioned resistance to technological and especially organizational changes and the cost of investing in these systems (the average cost of an image-processing system is U.S. $500,000) are mainly responsible for the slow growth of the market (see Table 12).

Figure 24
Number of image-processing solutions on the market since 1988



Source: Nomos Ricerca.

Table 12
Image-processing systems market in Italy, 1989–93
(billion lire)

Year	Sales
1989	21.1
1990	46.0
1991	75.4
1992	118.0
1993	166.0

Source: Nomos Ricerca.

7.3.2 Major Competitors

New competitors are entering the market in the administrative area. Entry barriers are higher in technical-documentation.

The number of operators in the administrative area will be constant after 1993.

The first differences from a qualitative point of view are beginning to be evident.

The major competitors in the image-processing market and their products are listed in Table 13.

Philips, with Megadoc, was the first company to enter the image-processing market (see Figure 25).

Examples of Italian Megadoc customers are the republic of San Marino, Reale Mutua Assicurazioni (insurance company), regional committee for the control of Regione Veneto, the health committee of Regione Lombardia, INA and the Centre for Studies of Advanced Technologies.

Table 13
Major competitors in image-processing market in Italy

Distributor	Product/solution
Philips	Megadoc
Olivetti	Filenet and Odis
IBM Semea	Image Plus
Eastman Kodak	Kims
Wang Italia	Wiis
Unisys	Infoimage solutions
Informix	Informix modules
Intergraph	Intergraph products
Italcad	Giant Solution
SGS	Archea
SPS	Laserview
Gisettanta	Drawing processor
Dipl	Doc Mem Rasted
Stelit	Star-Doc
Temi	Eldak products
3M	Docutron
Citec	Isr Professional-Isr Plus
Nexo	Discus
Rastercad	View Pack
Aitec	Dok Disk

Olivetti. Filenet and Odis are Olivetti's best known products.

Odis customers include: SNIA, INA, Insiel, Enichem, ENI, Sisde, SNAM, Datamont and the state police in Italy; Yves Saint-Laurent, Cerns and Le Département national pour l'éducation in France; Lloyds Bank and British Airways in the United Kingdom; and the municipality of Bonn, the University of Wurzburg and Deckel Industries in Germany.

The other Olivetti product, Filenet, has more than 350 installations in the world. In Italy these include the Ministry of the Interior, Fideuram, Seat, Assicurazioni Generali, Regione Veneto and the municipality of Firenze.

Wang. Wiis, the integrated office automation system developed by Wang that appeared for the first time in 1987, has some 300 installations all over Europe, although in Italy it is not so widespread. In Italy the customers are large companies like SIP (the public telephone company) and Fidia Sistemi.

Informix. Products for document imaging include a multimedia database engine, connectivity software that supports the most popular LANs and powerful application-development tools.

Informix is convinced that no single vendor can develop and deliver a complete document-imaging system today. To complete its document-imaging solutions, the company is actively pursuing relationships with different partners, from OEMs and system integrators to VARs and third parties.

Italcad, founded in 1987 and 100% controlled by Alenia S.p.A. (IRI-Finmeccanica group), is active mainly in the CAD/CAM/CAE segment of the market and has an activity line dedicated to technical-documentation management.

In 1990 this line represented 16.8% of Italcad revenues, representing a 286% increase from 1989. Its major competitors, operating mainly in systems integration and VAS, are:

- Andersen Consulting;
- Litton;
- IBM;
- Prime;
- Intergraph;
- Digital; and
- Olivetti.

Convinced of the importance of technical-documentation management, Italcad has planned the following:

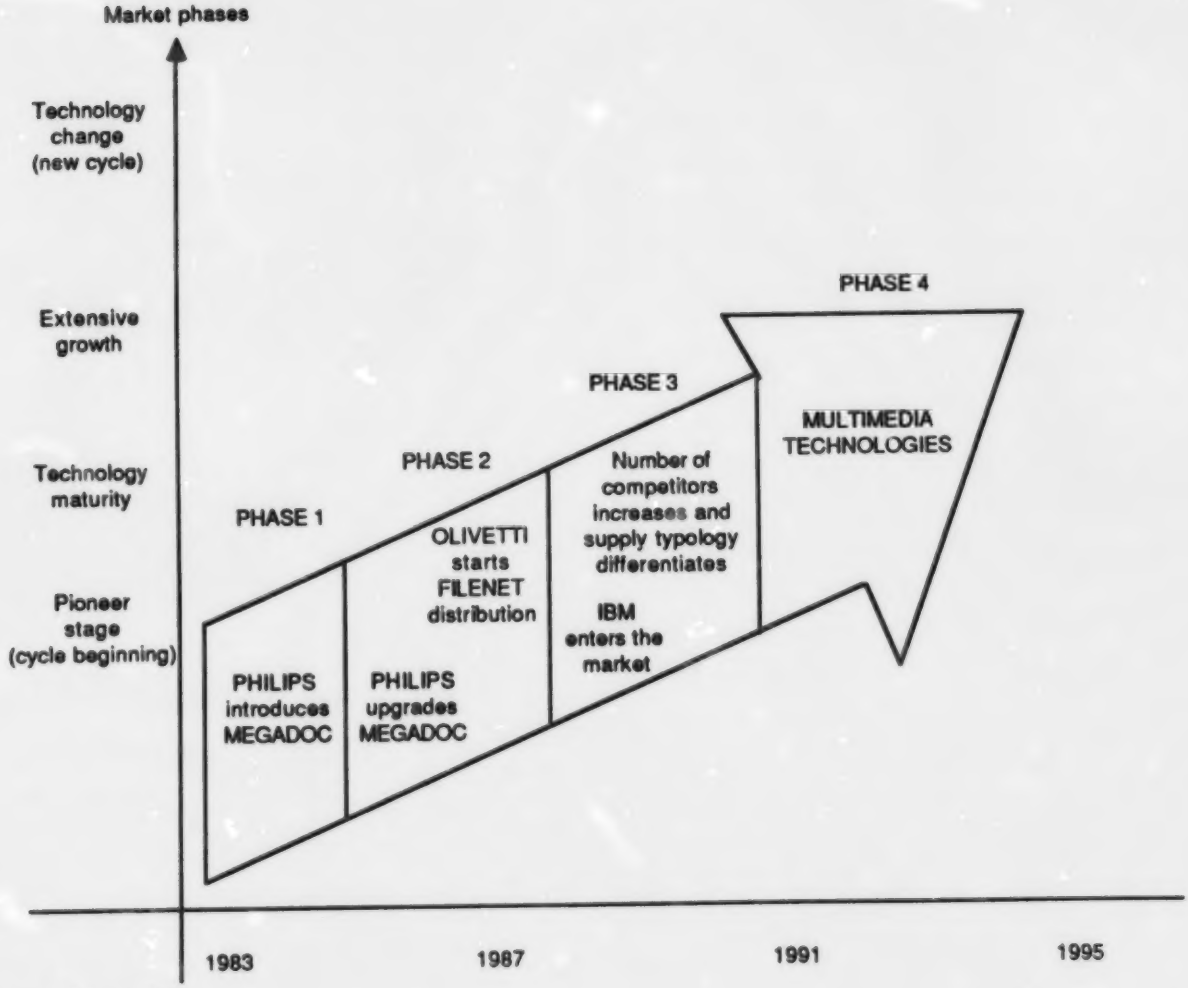
- enhancement of its proprietary product with new basic tools;
- distribution of third parties' hardware and software integrated with its product portfolio; and
- an increase in its level of specialization.

Because there is a demand for consulting and services in this segment of the IT market, many

companies are concentrating their efforts in these activities.

For example, Iter develops projects and customized services for the evaluation and selection of electronic-document management systems. It has also organized international meetings on new technologies and solutions for image processing.

Figure 25
Phase of the image-processing market in Italy projected to 1995



Source: Nomos Ricerca.

7.3.3 Major Customers

Table 14 show the image-processing market in Italy by segment. The largest growth is projected for the industry and credit institution segments.

Major barriers that organizations have to overcome in the process of implementing a document-imaging application are:

- Cost — Large systems can cost several millions U.S. dollars.
- Volatility — Technology is evolving so rapidly that solutions can quickly become obsolete; few standards exist to protect users' investments.
- Complexity — Document-imaging systems require the integration of several different technologies and often depend on multi-vendor inter-operability. Organizations may have to redesign their information flow entirely to take full advantage of new technologies.

On the other hand, it is difficult to see and measure the benefits:

- space reduction;
- improved productivity — particularly improvement of customer service;
- quality management;
- market responsiveness; and
- management control.

Consequently, only a few large industries and public entities have invested in image-processing applications.

Customers of technical documentation-management systems are mainly large mechanical and electronic industries:

- Ansaldo;
- ENEL;
- FIAT;
- Italtel;
- IVECO;
- Alenia;
- Magneti Marelli; and
- Aeritalia.

Very few installations are in medium-sized companies (those that have a turnover of 500 to 1,000 billion lire).

Table 14
Image-processing market in Italy by segment, 1989–93

	1989	1990	Growth 1989-90 (%)	1991	Growth 1990-91 (%)	1992	Growth 1990-91 (%)	1993	Growth 1990-91 (%)	AAGR (%)
Industry	1.5	3.1	106.7	5.4	74.2	9.4	74.1	16.3	73.4	81.6
Distribution	0.5	1.1	120.0	1.9	72.7	2.9	52.6	4.2	44.8	70.2
Services	5.5	10.5	90.9	16.0	52.4	20.5	28.1	24.3	18.5	45.0
Credit inst.	1.3	3.1	138.5	7.5	141.9	18.0	140.0	32.5	80.6	123.6
Insurance, financial	4.3	9.0	109.3	14.5	61.1	24.2	66.9	34.0	40.5	67.7
LPA and health	3.4	8.1	138.2	13.0	60.5	19.0	46.2	24.0	26.3	63.0
CPA	4.6	11.1	141.3	17.1	54.1	24.0	40.4	30.7	27.9	60.7
Total	21.1	46.0	118.0	75.4	63.9	118.0	56.5	166.0	40.7	67.5

Source: Nomos Ricerca.
Notes: AAGR average annual growth rate
CPA central public administration
LPA local public administration

In small industries, image-processing systems are under development only for environments with CAD and where the technology is advanced.

Potential customers of administrative documentation-management systems are those that have a high level of contact with the public. This sector is governed by legislation and regulations.

In the near future banks and insurance companies will be attractive target sectors. Major banks are now considering documentation management as an activity of high strategic importance, but the movement toward the adoption of imaging systems is slow because it means changing entrenched systems.

In the industrial sector, which is expected to invest heavily in image-processing systems, pharmaceutical companies are potential customers (they have to manage a huge amount of documentation and have to prepare reports for the Ministry of Health).

The following are examples of installations introducing image-processing systems:

- The press office of the Ministry of Post and Telecommunications developed with Apple an innovative hardware-software solution to manage all published articles.
- Italimpianti Sud (IRI group) has been using Eldak Card for three years to manage technical documentation transferred between China and Italy.

7.3.4 Market Opportunities

The market in which new competitors have to operate has the following characteristics:

- The demand for image-processing solutions is potentially very high.
- Supply is just consolidating from a methodological and technological point of view.
- Because implementing image-processing system is so complex, customers usually take three months to understand which type of suppliers they have to contact.
- No complete, integrated, perfectly working image-processing systems have been installed in Italy to date, but there are many pilot projects.
- The critical financial situation is an obstacle to investment.

Consequently, new players can be successful if they have:

- a high degree of application competence (knowledge of terminology and users' needs);
- good references and a good reputation (agreements with well-regarded Italian companies); and
- products to be integrated.

The most likely contacts for distribution of foreign products in Italy are hardware vendors and system integrators.

7.4 CAD/CAM/CAE

7.4.1 Market Size and Growth

The Italian CAD/CAM/CAE market revenues in 1990 amounted to 11% of the worldwide CAD/CAM/CAE revenues and 5% of the Italian IT revenues (see Table 15).

Table 15
CAD/CAM/CAE market in Italy, 1988–91
(billion lire)

	Value (billion lire)	Growth from previous year (%)
1988	607	n.a.
1989	800	32
1990	980	22
1991	1,127	15
1994	1,274[a]	13[b]

Source: Teknibank.
Note: n.a. not available
[a]Estimate
[b]1991–94 growth

Table 16 shows the number of CAD/CAM/CAE units installed in Italy to date.

Table 16
Number of CAD/CAM/CAE installations in Italy, 1985–90

Year	Units
1985	3,450
1988	23,200
1989	36,800
1990	51,700

Source: Teknibank.

Figure 26 illustrates the CAD/CAM/CAE market in Italy in various segments.

The Italian CAD/CAM/CAE market is one of the most dynamic in Europe (see Figure 27), with a growth rate superior to the European average (+18%).

Stand-alone CAD/CAM/CAE systems are past their introduction and development phases, but integrated systems are still in the introduction phase.

Market saturation and development of the replacement market are expected by the middle of 1990s.

7.4.2 Major Competitors

Table A8 in the Appendix shows the CAD/CAM/CAE market share of companies doing business in Italy.

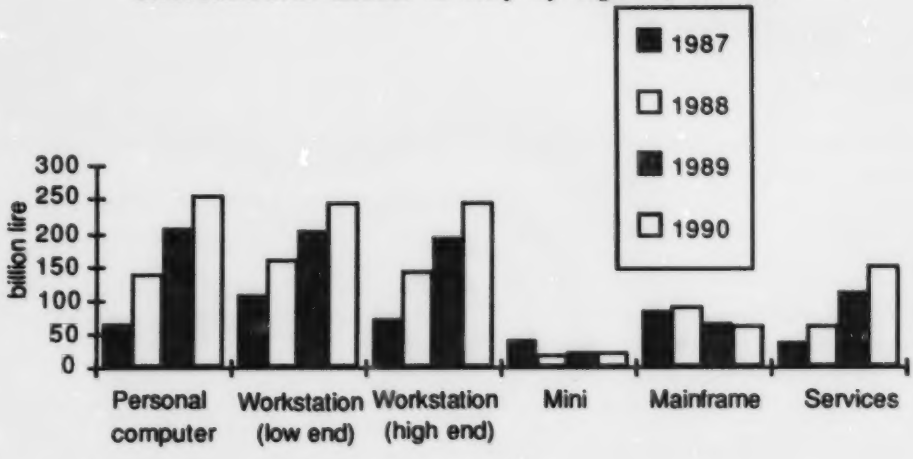
The players in the Italian CAD/CAM/CAE market fit into two categories:

- more than 200 are highly specialized; and
- about 600 are non-specialized and operate in the lower layers of the market.There are many distribution channels because of the spread of PC-based CAD systems and cheap packages not requiring the services of specialists.

Among the specialized suppliers, the most important are VARs. However, these are suffering from concentration, which will increase during the next years.

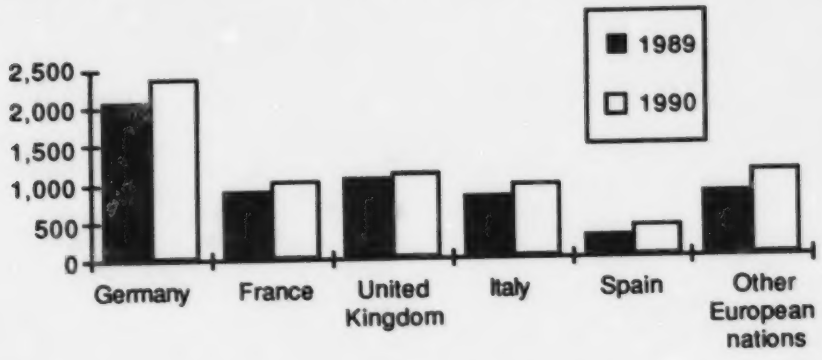
A high degree of concentration exists among hardware vendors: the top eight vendors cover almost the whole market. Among these are the largest worldwide hardware vendors and some vendors strongly specialized in the segment of graphic stations. This is the market with the highest import level, especially from the United States.

Figure 26
CAD/CAM/CAE market in Italy by segment, 1987–90



Source: Teknibank

Figure 27
CAD/CAM/CAE market in Italy and in other major European markets, 1989–90



Source: Teknibank

In the software sector there is greater fragmentation: the top eight players possess about 40% of the market. Besides large multinational companies (already present as hardware producers) and U.S. software leaders, there are a significant number of Italian developers.

The problem for Italian software houses is not the quality of their products but their small size, their non-consolidated organizations and their lack of technical specialists and internal resources. These factors make it difficult for the software houses to provide customers with the expected level of service.

7.4.3 Major Customers

The results of the analysis of CAD penetration in the Italian economy are the following:

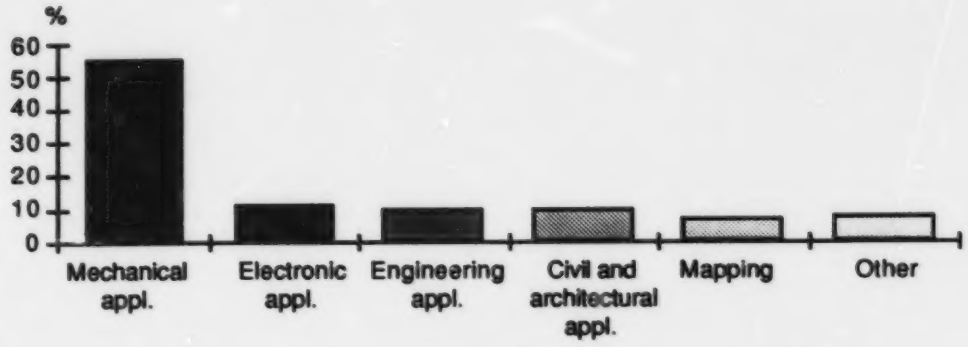
- Market penetration is increasing vertically and horizontally.
- Because of the availability of PC-based and low-end workstation-based solutions, the use of CAD has become possible in companies where the cost-benefit ratio was previously adverse.
- Sectors that have always been innovative (aeronautical and motor industries) typically choose CAD/CAM/CAE systems; new sectors, such as textile, furniture, boot and shoe, and continuous process industries are now also choosing these systems.
- Public administration is asking for CAD/CAM/CAE solutions (particularly in territory, environment and architecture-cadastral management).
- In industrial companies, one designer in seven is currently working at a CAD workstation.
- CAD solutions are applied in 50% of the companies with more than 200 designers and in 15% of the companies with 20 to 200 designers.

The role of CAD is changing. In the past CAD was used primarily for design and drafting. The emphasis has now moved to such CAE functions as analysis and simulations. Integration with technical departments and with other factory applications is growing too, although it covers only 25% of the market.

Mechanical applications cover 55% of the market (see Figure 28), and their share is expected to remain steady.

The demand for CAD for electronic applications has rapidly decreased, and the growth of the market for technical applications has been lower than expected. Engineering, civil and architectural applications have had a remarkable growth rate, and a rapidly growing trend is anticipated for mapping.

Figure 28
CAD market in Italy by application, 1990



Source: Teknibank

7.4.4 Market Opportunities

In the near future, players' interest in the Italian CAD/CAM/CAE market will be focused on small- to medium-sized industries and professional studios.

For small- and medium-sized industries that lack specific knowledge, several factors will contribute to success in the market (see Table 17). For example, it will be very important to be able to refer to the know-how and expertise of suppliers who can propose ad hoc solutions. Applications consulting will be required in a market in which there will be a higher level of competition and in which valid products (including Italian ones) already exist.

Table 17
Capabilities critical to the success of small- and medium-sized firms in the CAD/CAM/DAE market

Services offered	Level of importance
Expansion and integration	**
Quality post-sale technical assistance	****
Pre-sale application consulting	***
Training	**
Commercial conditions	*
Turnkey products	**
Application specialization	**

Source: Teknibank
Notes:
* Not very important
** Important
*** Very important
**** Essential

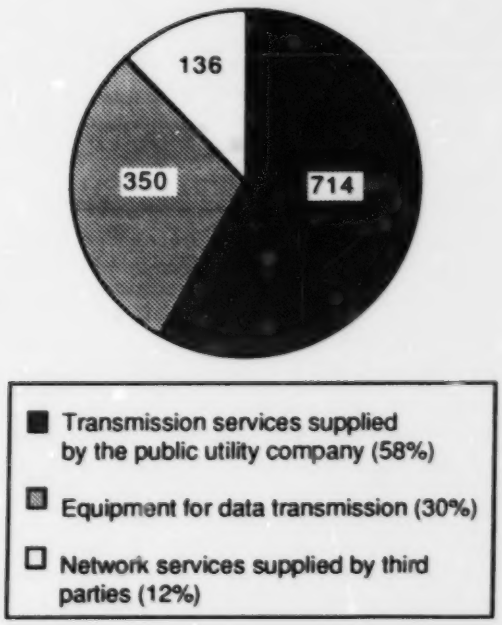
8. CONNECTIVITY AND NETWORKING APPLICATIONS

8.1 Definition

Connectivity and networking applications. Software that allows:
- office data communication and sharing;
- communication between information systems installed in different departments;
- communication between different companies;
- data exchange between companies and their customers and suppliers; and
- data and services transmission from private and public companies to end-users.

The distance between the communicating computer and its components determines the environment:
- WAN (wide-area network);
- LAN (local-area network);
- MAN (metropolitan-area network);
- distributed multi-vendor environment; or
- other.

Figure 29
Data-communication market in Italy, 1990
(billion lire)


136
350
714
Transmission services supplied by the public utility company (58%)
Equipment for data transmission (30%)
Network services supplied by third parties (12%)

Source: Reseau.

8.2 WANs

8.2.1 Definition

WAN. A system that makes it possible to communicate over long distances using any of a number of methods:
- public phone network;
- private phone network;
- public data networks (Itapac, Fonia Dati Network, Data Over Voice, others);
- complex, dedicated company networks; and
- network value-added services (VAS) supplied by third parties.

Users have great expectations for an integrated services digital network (ISDN), now a pilot project in Italy. ISDN could satisfy company demand for global transfer of voice, data and images.

8.2.2 Market Size and Growth

In 1990 the Italian data-communication market reached 1,200 billion lire (see Figure 29). The market showed an annual growth rate equivalent to 10% in each of the last two years.

8.2.3 Major Competitors

The development of data-communication networks has created many opportunities for the supply of VAS. Users are interested in VAS because they foresee the following advantages:
- no initial investment;
- low operational cost; and
- productivity increase.

Large companies lease lines from the public utility company (SIP) and develop new applications to enhance the service. The result is that major telephone users supply better and less-expensive network services than the public utility company.

The supply is divided into the following typologies:
- office automation (message transmission, access to data bases);
- data collection (credit authorization, electronic fund transfers, order transmission);

- telesoftware (support to distributed EDP, tools for software development); and
- telemetry (Telealarm, Telecontrol, Telemeasures).

The Italian VAS market has about 20 major suppliers, usually large Italian companies or groups. Some examples are:

Geis. The Geis network is one of the largest private networks in the world. In Italy it has about 30 nodes. The services available are:
- logistics (60%);
- reporting systems;
- banking and financial applications; and
- office automation.

Intesa (joint venture of FIAT and IBM). This is the telematic infrastructure for FIAT and other manufacturing companies. The services provided are:
- logistics; and
- and distribution (credit card, insurance, financial applications).

The supply covers:
- consulting;
- software development;
- training;
- system integration; and
- sales of hardware and PC software.

Seat Sarin (SIP-STET group). Seat Sarin specializes in supplying public users with realtime global information. Examples of its telematic services are:
- electronic yellow pages (provides information about one million Italian companies);
- Amedeus (lists all Italian "protesti" (nonpayments of debts) for the last five years);
- Ansatel (provides worldwide newspaper service);
- Noopolis (provides world knowledge);
- hotel teletourism (provides vacancy rates and prices of more than 37,000 hotels in Italy with free-of-charge telebooking);
- Dag Electronic Edition (lists worldwide flights, prices, tourist information, hotels);
- Mastermail (provides electronic mail);
- Matrix (sends and receives telexes);
- Magic on line (accesses 1,200 worldwide databases);
- Avistel (provides Avis car prices and telebooking);
- tax databases (provides information on tax laws); and
- Dilov (provides information on work laws).

Seva. The network is based on public lines with 47 access points and international links through Infonet. The services provided are:
- teledidactics (50%);
- message management;
- data banks;
- electronic fund transfers; and
- point-of-sale payment management.

Teleo (SIP-STET group). With two centres connected through the Itapac network, Teleo offers services to 100 nodes on the network.

It is a leader in message-management services (Mastermail for text messages, Eloise for voice messages).

Televas (1985 joint venture of STET and the Ferruzzi group). The service offered through 100 nodes of the Itapac network is the electronic data interchange for distribution and transport.

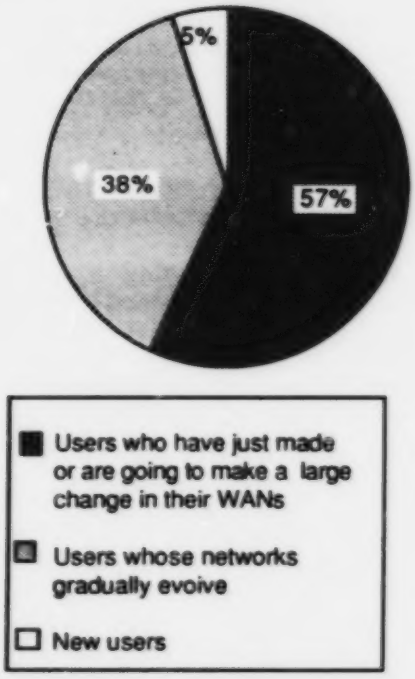
Olinet (Olivetti group). Infonet is the largest private network in the world. It is accessible from all public networks (Itapac, Transpac, Datapac). The services provided on Infonet are:
- the collection and geographic distribution of administrative, financial, agency and warehouse data and orders;
- electronic mail; and
- EDI.

Others. Other VAS suppliers are:
- Cerved (100% national chambers of commerce);
- Radiocar-Telerate (Olivetti group);
- Reuters;
- Datamont (Montedison group);
- Pirelli Informatica (Pirelli group);
- IBM Seti;
- Enidata (ENI group); and
- SIA (Banca d'Italia) and ABI (the Italian banks association).

8.2.4 Major Customers

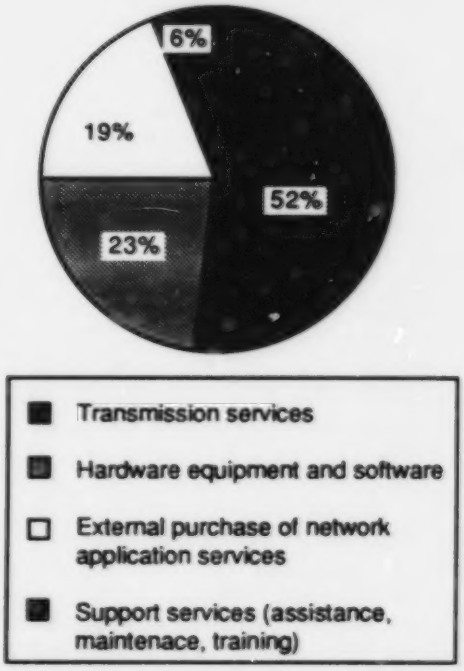
Figure 30 shows the large-company market for WANs in Italy.

Figure 30
Large companies in Italy that have or plan to have WANs


5%
38%
57%
Users who have just made or are going to make a large change in their WANs
Users whose networks gradually evolve
New users

Source: A Reseau study based on a sample of 122 large users who manage 131 dedicated networks and more than 60 private phone networks.

Figure 31
Italian users' WAN expenditures, 1990 (total, 745 billion lire)



Source: Reseau

The credit institutes and services companies are the most dynamic market sectors for networks.

Figure 31 shows the expenditures made in various segments of the Italian WAN market.

8.3 LANs

8.3.1 Definition

LAN. A system, mainly for PCs, that allows data, message and resource interchange between workstations in the same building or in adjacent buildings. The network may be extended through direct links between LANs or through an intermediate geographic network.

In a LAN, the PC is used as a multifunctional workstation with a user-friendly interface and the ability to archive. More powerful minis and micros may act as communication or file servers, networks and data-flow controllers.

The LAN market is the only market in Italy where software already has a greater importance than hardware (see Table 18).

The growth rate for 1989, 1990 and 1991 is constant and equivalent to 20% per year (source: Teknibank). The growth rate should decrease to about 15% between 1993 and 1995 (source: Digitronica).

Table 19 shows the sales of LAN platforms in Italy.

Table 18
LAN market in Italy, 1989, 1993
(billion lire)

	1989	Share (%)	1993	Share (%)
Hardware	93	36	190	26
Software	82	32	243	34
Services	83	32	283	40
Maintenance	(41)	—	(143)	—
Total	258	100	716	100

Source: Teknibank.

Table 19
Breakdown of sales by LAN platform in Italy, 1989–94
(million U.S. dollars)

	1989	Share (%)	1990	Share (%)	1991	Share (%)	Share 1994 (%)
Ethernet	42.1	73	46.5	68	51.5	65	44
Token Ring	10.2	18	15.6	23	21.8	28	53
Others	5.2	9	6.0	9	5.8	7	3
Total	55.5	100	68.1	100	79.1	100	100

Source: IDC.

Technological systems have been standardized in the lower layers of connectivity. The major players are:

- Digital, which supplies components to enhance the Ethernet system; and
- IBM, which dominates the Token Ring market (other Token Ring suppliers, such as Ungermann-Bass, Madge and Proteon, have a marginal percentage of sales).

The operative systems sector in Italy is dominated by:

- Novell Netware (about 60%);
- Microsoft LAN Manager and different OEM versions (about 25%); and
- Banyan Systems Vines (about 5%).

Interviewed users confirmed they plan to install LAN operating systems in the next two years according to the percentages reported in Figure 32.

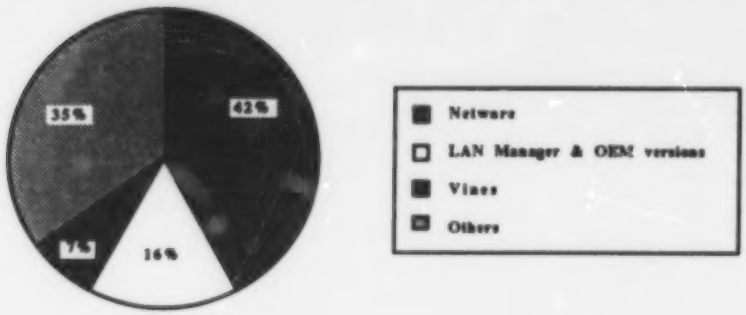
Because of the users' demand for integrated systems, the major suppliers (see Table 20) are working to offer products and services that can solve all the problems of internetworking:

- Microsoft offers application packages, operating systems, network operating systems, distributed database access systems and mainframe internetworking systems.
- Coris (a joint venture of Microsoft and Olivetti) has been set up as a company dedicated to connectivity consulting.

Table 20
LAN software experts in Italy

Company	Activity
3Com Italia (agency)	It is taking a new position in the market after leaving its software to Microsoft
Adcomp Data Systems Italia (agency)	Distributes LAN products
Algol	Distributes Microsoft, Olican and other companies' connectivity products
Apple Computer (agency)	Distributes all Macintosh family products
Carboduplex New (agency)	Distributes Sony products
Channel (agency)	Distributes many U.S. products
Com Tech	Develops LAN set-up and provides consulting service
Data General	Provide solutions for LAN environment
Datapoint Italia (agency)	Distributes U.S. parent company's products
Delta	Distributes Macintosh products
Digitronica	Distributes LAN solutions
EIS	Distributes application software and OSs for LANs (Novell)
Elcom	Distibutes Macintosh products
Fast Italia	Distributes many companies' products and LAN OSs; develops LAN application software
Hewlett-Packard Italiana (agency)	Distributes all kinds of products, including LAN solutions and application software
IBM Semea (agency)	Distributes parent company's products
LAN Systems	Distributes Corvus LAN OSs
Lifeboat Associates Italia (agency)	Distributes LAN application software
Microsoft Italia (agency)	Distributes LAN Manager and other LAN software products
NCR Italia	Acts as Microsoft OEM for LAN Manager
Novell Italia (agency)	Distributes Netware and other Novell products
Oasis	Distributes Invisible network
Olivetti System & Networks Italia	Provides LAN solutions
Opc LAN	Distributes Netware
SIA (Soluzioni Informatiche Avanzate)	Distributes Ast, Microsoft and other companies' products
Siosistemi	Sells of value-added LAN products, including Powerlan (performance technology)
Uniautomation	Distributes Ungermann-Bass product
Unidata	Distributes LAN products

Figure 32
Forecast of LAN installations in Italy for the next two years



Source: Business Research Group.

- Digital offers Network Application Support as its unified formula. Its recent agreement with Apple is as an important act in the integration strategy.

- Systems Center Italia offers Net/Master, a system that automates the management of a distributed multi-vendor environment (chosen by 100 companies in Italy and by 2000 companies worldwide).

8.3.2 Major Customers

There are 630,000 estimated potential customers for the LAN market in Italy. Among these only 0.6% (3,780) had a LAN in 1986, while more than 16.5% (100,000) expect to have at least one by 1994 (source: Teknibank).

Figure 31 shows the presence of LANs among microcomputer users in 1990 and the distribution of LANs by market sector.

The LAN market is horizontal. Potentially it will involve all customer types.

According to Digitronica, LAN users are mainly small organizations:
- those that have LANs with three or four nodes (80%); and
- those that have LANs with more than 500 nodes (15%).

A high growth rate is expected, mainly because of the greater use of LANs among small users (see Table 21).

Table 21
LAN use in Italy by market segment

	1984	1993
Large users	25	24
Medium-sized users	48	37
Small users	27	39

Source: Teknibank.

The demand for LAN substitutions currently is limited, but it is expected to grow to about 35% by 1993.

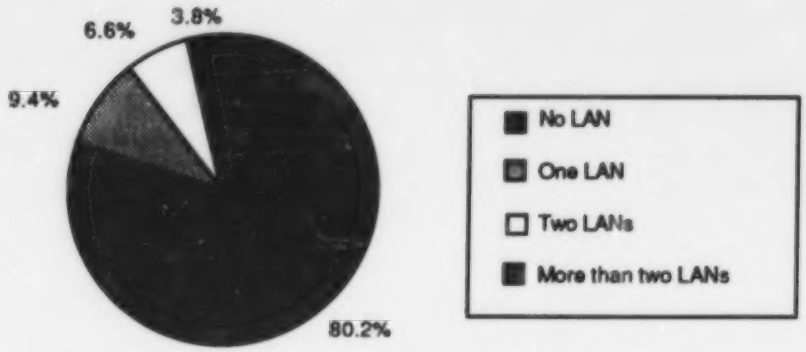
LANs installed in industries have only 10% of the whole market (see Figure 33). This situation is expected to be the same for the next few years. Most LAN installations are in office environments.

Only 20% of installed PCs are currently linked to LANs: this percentage is expected to grow rapidly.

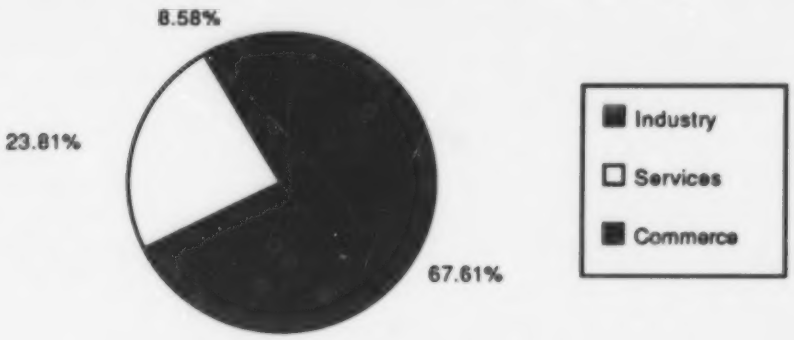
Public administration is the sector with the slowest spread of LANs.

Figure 34 shows the LAN modes installed Italy as of 1990.

Figure 33
(a) Presence of LANs among minicomputer users in Italy, 1990



(b) Presence of LANs among LAN installations by market sector, 1990



Source: An IDC Italia survey of about 170 medium-sized to large companies, operating in sectors where minicomputers are installed.

The LAN market has been strictly linked to the consolidation of leading standards in the lower layers of connectivity. This allows users to use equipment in which they already have an investment.

During the past, years distributors (1,000, according to Teknibank, among which only 500 provided constant service) showed little professionalism in supplying services and support.

If suppliers consolidate standards and provide higher quality support networks, users will be able to plan connectivity in a more professional way.

To date LANs have been used to allow communication between printers or files. The challenge now is at higher levels of connectivity: LANs require increasingly expensive, complex, functional software.

New software is needed to guarantee efficient group work: this is the so-called groupware.

This is a market with great potential, characterized almost exclusively by foreign products. An increasing number of agencies of multinational companies (particularly American) are now entering the Italian market. In the past these companies used local distributors.

Examples of available products are:
- Coordinator;
- FrameWork II;
- Sql-Mail;
- Higgins mail;
- Notes;
- View-Star;

- Staffware;
- Calypso;
- Xanadu;
- Hyperdoc;
- Rms;
- Notecard;
- Hypercard;
- Idex;
- Guide;
- For-Comment; and
- Hyperboard (one of the few Italian products).

Hardware vendors have produced the following groupware:

- New Wave (Hewlett-Packard);
- Ibis (Olivetti); and
- Office Vision (IBM).

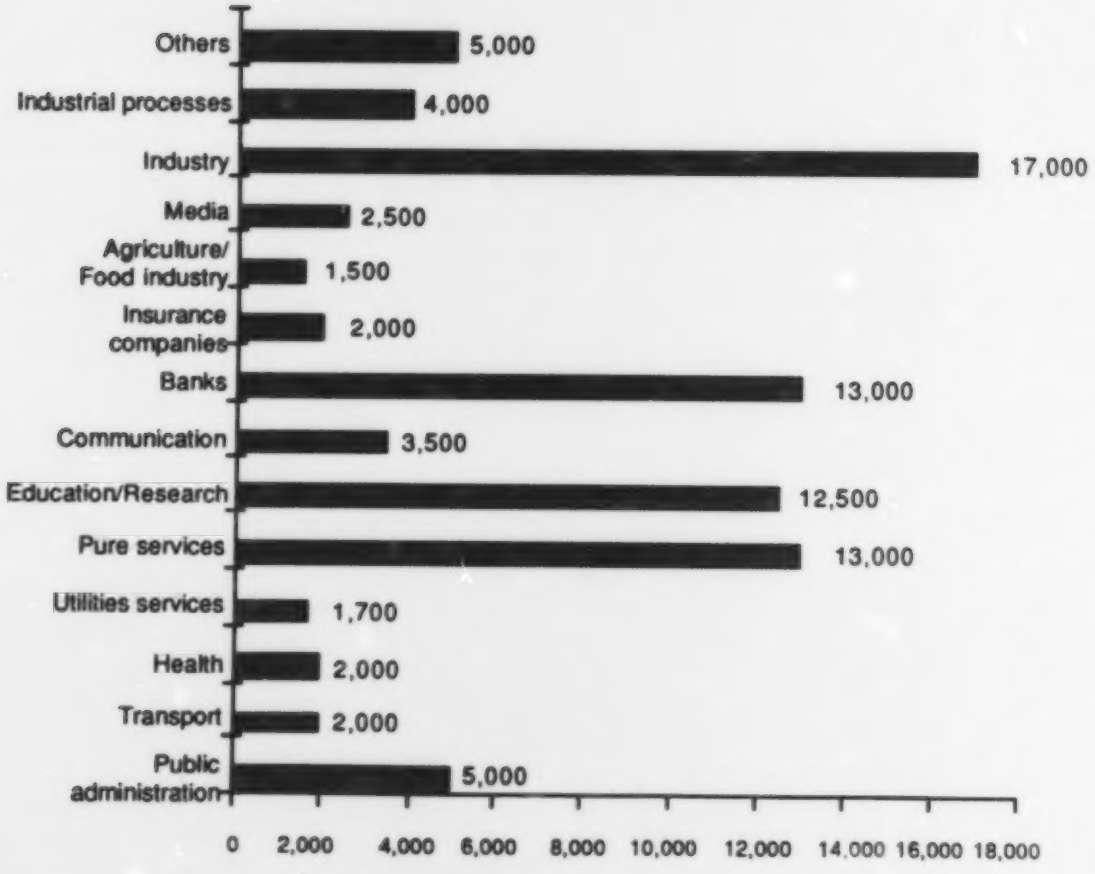
8.4 Market Opportunities

The Italian market for connectivity and networking applications will offer opportunities to suppliers of:

- products with potential for internetworking (between different computers, different networks and the different combinations of hardware components);
- very specific LANs (multimedia LANs for image transfer, multimedia electronic mail, CD-ROM satisfying Italian standards); and
- applications for office automation (work group, information retrieval, etc.).

Possible contacts are the main Italian distributors of networking software.

Figure 34
LAN nodes installed in Italy, 1990
(total, about 85,000 units)



Source: Teknibank.

8.4.1 Promotion and Opinion Makers

Magazines specializing in connectivity and networking applications are:

- *Networking Italia* (just released);
- *Data Communication*;
- *LAN Times*;
- *Multinet*;
- *Telecommunication*; and
- *Transmissioni dati e Telecomunicazioni*.

Opinion makers include:

- university teachers (Prof. LeMoli, Prof. Decina, Prof. Bozzetti);
- major players (Microsoft, Novell); and
- market research institutions (Nomos, Reseau).

9. UTILITY AND PRODUCTIVITY TOOLS

In Italy the term "utility and productivity tools" is not used to identify a specific area with its own products, suppliers, customers, etc. That is, the utility and productivity tools market does not exist as a stand alone-market.

The following packages can be included in utility and productivity tools:

- text-retrieval and desktop-publishing products, which are horizontal productivity tools;
- CASE and OOP tools are vertical productivity tools (for information professionals);
- 4GL and DBMS tools, which are vertical productivity tools (for managers);
- data communication tools, which are vertical productivity tools (for non-information professionals); and
- artificial intelligence tools, which are vertical productivity tools (for non-information professionals).

Because of the variety of tools included in utility and productivity tools, they are discussed in detail elsewhere in this report.

10. HEALTH INFORMATION SYSTEMS (HIS)

10.1 Definition

Health information systems. material and human resources dedicated to the management of information flow in the health environment.

Material resources include information technologies (hardware and software) that guarantee the accuracy and efficiency of data collection, storage and elaboration.

The HIS include organizational or administrative aspects and clinical aspects.

10.2 Market Size and Growth

Most of the HIS market is represented by the public sector. Private health care organizations do not invest heavily in IT. Instead, they give a high priority to medical equipment, which is very expensive.

Because of the high cost of medical instruments, computers and software are often supplied free with medical equipment.

Consequently, estimates related to the HIS market usually refer only to the public sector and do not include hardware and software supplied as part of the cost of medical equipment. The result is that the value of HIS sold is underestimated by 20–25%.

Figure 35 shows how the Ministry of Health allotted its funds for automating the national health system.

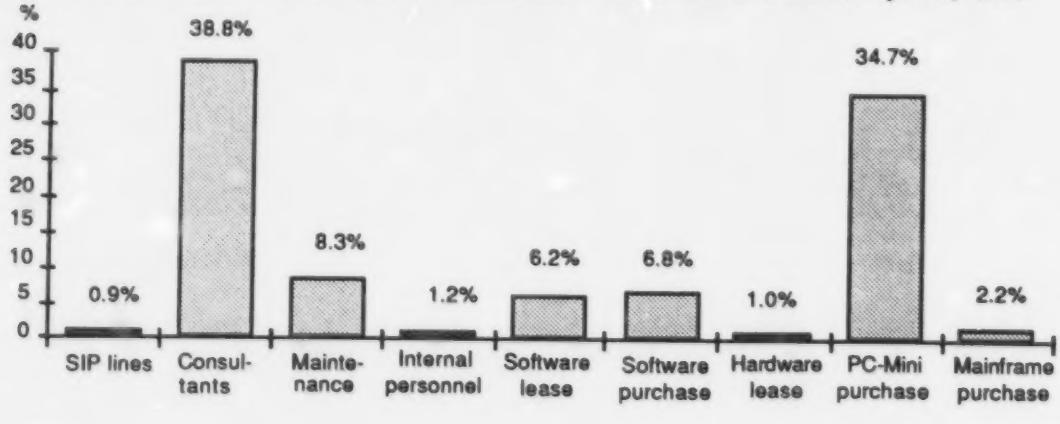
According to Nomos/Sirmi, the HIS market in 1990 amounted to about 70 billion lire (public sector) and had a growth rate (public and private) of 14% in that year (source: Assinform). Reported data include state agreements, and are spread over 1,117 hospitals and 673 USLs (local health units), but do not include expenditures in the 643 private nursing homes in Italy.

The Ministry of Health assigned to Italsiel (IRI – Finsiel group) the major project of automation of the national health system in 1992. The HIS that Italsiel is installing will manage and process information about peripheral expenses and the health data for Italy's population.

About 300 Italsiel consultants were involved in the development of the system. Only 23 national health EDP staff were involved, allowing little opportunity for education.

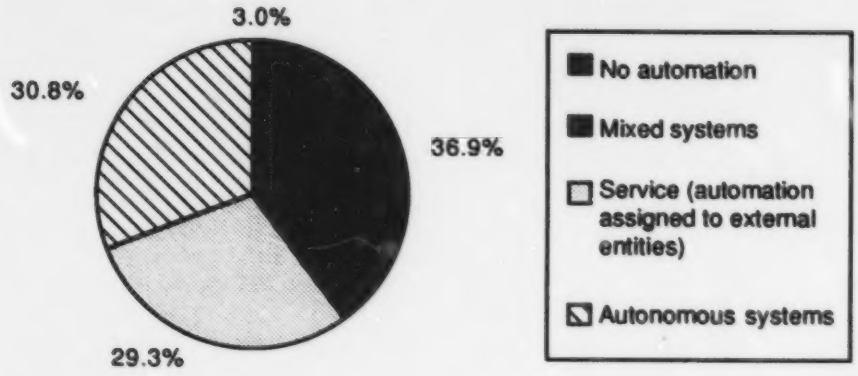
Figure 36 shows the state of automation in local health institutions in Italy in 1990.

Figure 35
Ministry of Health expenditures for automation of the national health system, 1990



Source: Governmental Stationary Office.

Figure 36
Automation in local health institutions in Italy, 1990



Source: Governmental Stationary Office.

10.3 Major Competitors

Of all the Italian software companies, only about 290 operate in the HIS market: 10% of these have continual production; all the others produce only one or two applications.

Some companies with continual production cover a number of application areas. Others are more specialized: either they produce administrative software or they produce software for specific health sectors (radiology, cardiology, etc.).

Because of delayed payments by the public administration and the duration of major projects, only large companies can successfully tender for these contracts.

For large projects, hardware companies and financial consulting companies operate as prime contractors; in some cases, customers explicitly request that hardware companies act as prime contractors.

All major hardware vendors (IBM, Bull, Olivetti, Digital, Hewlett-Packard, Siemens) are active in the public administration sector: when involved in the development of large HIS, they often collaborate with major systems integrators.

In Italy, political characteristics and policies vary from region to region. Consequently, each region has its favourite large software and service companies to which it assigns project coordination.

Companies operating mainly in the administration sector are:
- Italsiel;
- Insiel;
- Celcoop;
- Lombardia Informatica;
- CSI Piemonte;
- System & Management; and
- Cap Gemini;

Companies operating mainly in analysis laboratories are:
- SIS
- Gisettanta; and
- GSO.

10.4 Major Customers

Major customers of HIS are:
- public administration (about 85%); and
- private health organizations (about 15%).

The information flow between the public and private sectors is still on paper: in the future automatic data communication will be necessary.

Investments in administrative applications are higher in central and southern Italy than in northern Italy, whereas investments in medical applications are distributed equally all over the country.

All projects exceeding 70 million lire are assigned through tenders. Each customer has its own tendering procedures that must be followed.

Because of the political involvement in the process, the winner has usually already been chosen when the call for tenders is made.

The relationship between customers and suppliers usually lasts many years:

- The initial purchase agreement generally includes a software licence; the following contracts include software development, consulting, etc;
- Negotiations for medium-sized projects generally take 18 months; for large projects, three years.

In the private sector, firms supply software directly. It is common to find leasing and factoring applied.

10.5 Market Opportunities

Relatively undeveloped market segments (see Figure 37) that offer opportunities for the introduction of new software solutions are:

- public, environmental, work hygiene;
- social assistance; and
- veterinary science.

In the health services market, new software solutions are needed for:

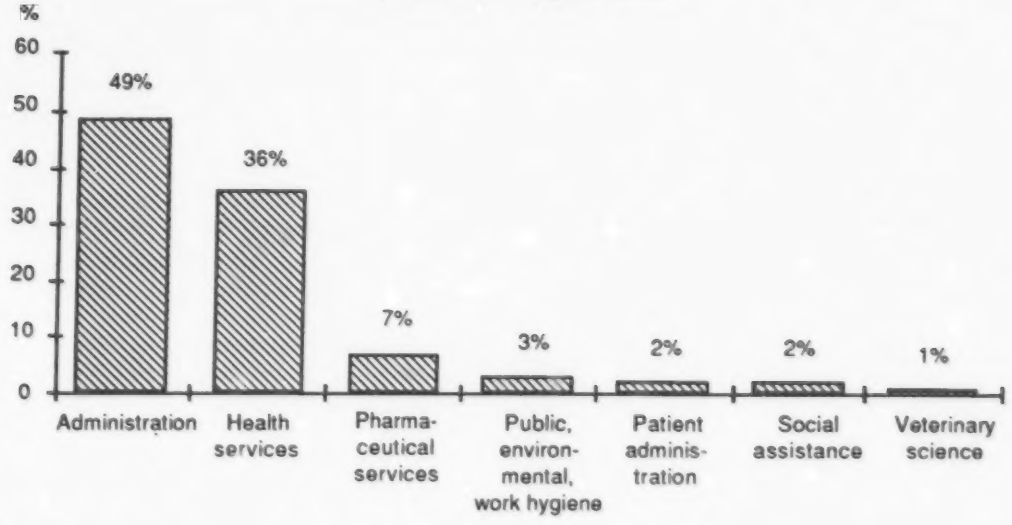
- complete internal administration of hospital in-patient departments;
- management of basic sanitary districts; and
- management of first aid centres.

In the HIS market, much of the software (57%) does not use a DBMS.

Only 12% of the production is performed with Oracle; 8%, with Informix. Software houses face problems of software conversion, which is expensive and time consuming.

The health market is currently regarded as a marginal market: there are very few players who operate exclusively in this market or are engaged mainly in automation of local health units.

Figure 37
Software applications used by the health sector in Italy, 1990
(total, 900 applications)



Source: Points S.r.l.

Almost all projects have been designed to solve administrative problems rather than automate specific areas, such as:

- analysis laboratories;
- diagnostics; and
- clinical medicine.

Future trends will be toward building up integrated HIS. However, the process will be very slow because of organizational and structural obstacles, such as:

- differences among health units and among departments inside each unit;
- the lack of an IT culture in the medical environment; and
- an absence of an acknowledged manager responsible for hospital administration.

The practice of assigning projects to financial companies is typical, especially in the province of Rome. After winning the contract, a company assigns parts of the project to external resources and software houses specializing in the appropriate areas.

In some cases, small to medium-sized software houses form ad hoc associations to tender for specific contracts.

Examples exist of software companies formed for the automation of a specific hospital (generally a private hospital). For example, Bioinformedical, belonging to IBM, was constituted exclusively to develop applications for the San Raffaele hospital in Milan (a private hospital regarded as one of the most advanced in Italy).

The many differences between one hospital or USL and another have created the following situation:

- All projects are commissioned.
- Distributors do not exist.
- When previously developed applications are installed in new health units, they have to be heavily customized (at least 30% have to be modified).

Packages for the financial, administration and patient care and management sectors are Italian. Packages for more specific use (teleradiology, analysis laboratory, three-dimensional studies, etc.) may come from outside Italy.

Despite the influence of lobbies, the HIS market is slowly evolving toward a culture in which IT experts are included on committees discussing large health projects:

- University computer science teachers give advice on administrative applications.
- Bioengineers give advice on medical applications.

Consequently, space for new competitors might be created, particularly for medical applications.

Firms might be able to enter this market by:

- offering packages for specific clinical niches;
- participating in EC projects in collaboration with an Italian group (e.g., Finsiel); and
- supplying semi-customized software while acting as systems integrators in large projects (substantial liquid assets are required; there is little probability of success because of the political lobbies).

10.6 Promotion and Opinion Makers

No specific publications of any relevance for the HIS market exist, apart from *Medicina Informatica*, which is just making its first steps into this sector.

"Smart Hospital," in its second year, is aiming to become the main HIS fair.

"Computers in Cardiology" is a high-technology convention.

SMAU, not specifically organized for this market, is a suitable convention for presenting solutions for health environments.

Many medical associations exist, but none has been specifically founded to deal with IT in health systems.

Medical staff now travel to conventions and fairs abroad. A well-known Italian or foreign (particularly U.S.) head physician has a lot of influence in the choice of medical packages.

10.7 Market Peculiarities

There are a limited number of professional roles in the government IT environment. Consequently:

- There is no professional or economic incentive to undertake a career in EDP centres in health institutions.
- The implementation and management of information procedures have to be contracted out to external specialists.

10.8 The CSI Piemonte Case

CSI Piemonte is a major Italian regional consortium for IT systems.

Founded in 1977 as a joint venture by Regione Piemonte, the university of Torino and the Politecnico of Torino, it is now operating as an autonomous entity with a staff of 320 and a turnover of 40 billion lire.

CSI's main area of activity is the health sector. It is also involved in:

- local entities;
- environment;
- transportation;
- agriculture;
- tourism;
- libraries; and
- territory.

Having a strong base in the Piemonte region, CSI is now working to sell its products and services outside the region.

CSI has rarely been involved in the health projects financed by the Ministry of Health.

Instead, its health projects are mainly for the regional health "Assessorato" (5 billion lire investment per year) or for the USLs, to which CSI's commercial arm sells products and services door to door.

CSI is now planning to also supply USLs in other regions.

In the health administration sector, CSI's Expert Sanita™ products and services cover the automation of various USL functions:

- demographic;
- financial;
- technical; and
- secretarial.

Another sector of high investment is the automation of specific clinical areas, which CSI pursues in collaboration with high level staff of hospitals. Examples are products for dialysis, radiology, diabetics and therapy products. In these specific areas, where there is a high potential for the suppliers of software solutions, the issue for the future will be the definition of standard products.

According to one of CSI's directors, the market for automation of administrative systems in the health sector is saturated (substitution in the north of Italy; first automation in the south). Areas to be developed are solutions for environment hygiene and clinics.

To further develop its business, CSI Piemonte, whose technological skills are very strong, is looking for commercial partners.

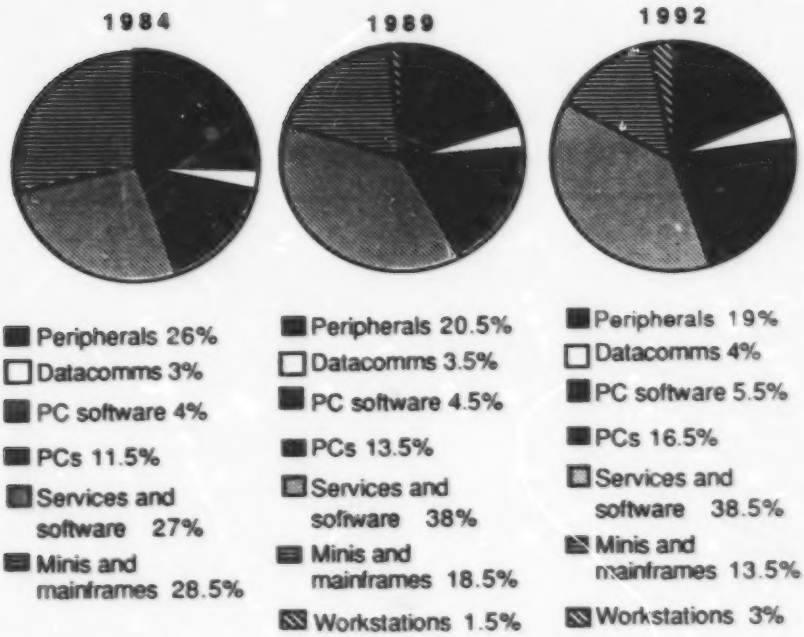
APPENDIX

Table A1
IT world market by areas, 1989–90
(billion U.S. dollars)

Area	1989	1990	Growth %
North America[a]	146	158	8.2
Southeast Asia[b]	72	81	12.5
Western Europe	119	131	10.1
Rest of the world	27	30	11.1
Total	364	400	9.9

Source: Nomos Ricerca.
[a]USA and Canada.
[b]Japan, Singapore, Hong Kong, Taiwan, North and South Korea.

Figure A1
IT world market by segment



Source: Price Waterhouse.

Table A2
IT world market, 1989–90: major countries
(billion U.S. dollars)

	United States		Japan		Germany		France		United Kingdom		Italy		Spain		South Korea	
	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990
Hardware	64.0	66.0	38.4	42.6	15.4	17.0	10.2	10.7	12.0	12.4	7.3	7.7	3.1	3.4	1.1	1.4
Software; information services	73.5	83.1	21.7	25.4	8.7	10.1	9.1	10.6	7.4	8.6	4.7	5.6	1.3	1.6	0.5	0.7
Total	137.5	149.1	60.1	68.0	24.1	27.1	19.3	21.3	19.4	21.0	12.0	13.3	4.4	5.0	1.6	2.1
Growth, 1989–90 (%)	8.4		13.1		12.4		10.4		8.2		10.8		13.6		31.2	

Source: Nomos Ricerca.

Table A3
Global revenues for packaged software, 1989–90:
top 25 independent software vendors
(million U.S. dollars)

Company	Worldwide 1989	Worldwide 1990	Growth 1989–90 (%)
Computer Associates International	1,290.0	1,310.0	2
Microsoft Corp.	819.4	1,276.0	56
Lotus Development Corp.	556.0	684.0	23
Oracle Corp.	542.8	677.7	2
Dun & Bradstreet Corp.	435.0	539.0	24
WordPerfect Corp.	282.0	407.2	44
Novell Inc.	280.5	398.0	42
SAP AG	205.7	286.0	39
Software AG of N. America	198.7	260.6	31
SAS Institute Inc.	295.6	240.2	17
Ask Computer Systems Inc.	N/A	239.7	N/A
Autodesk Inc.	178.6	237.8	33
Ashton-Tate Corp.	262.7	227.8	-13
Pansophic Systems Inc.	186.3	215.3	16
Cincom Systems Inc.	165.1	207.7	26
Borland International Inc.	96.5	183.7	90
Legent Corp.	141.4	175.7	24
Information Builders Inc.	147.2	167.3	14
Software Publishing Corp.	110.4	153.5	39
Candle Corp.	128.1	151.4	1
McDonnell Douglas Systems Int. Co.	113.0	132.0	17
BMC Software Inc.	82.0	125.0	52
Informix Software Inc.	140.7	121.3	-14
American Management Systems Inc.	98.5	120.9	23
Aldus Corp.	88.0	120.1	36

Source: *Software Magazine.*
Note: N/A not available.

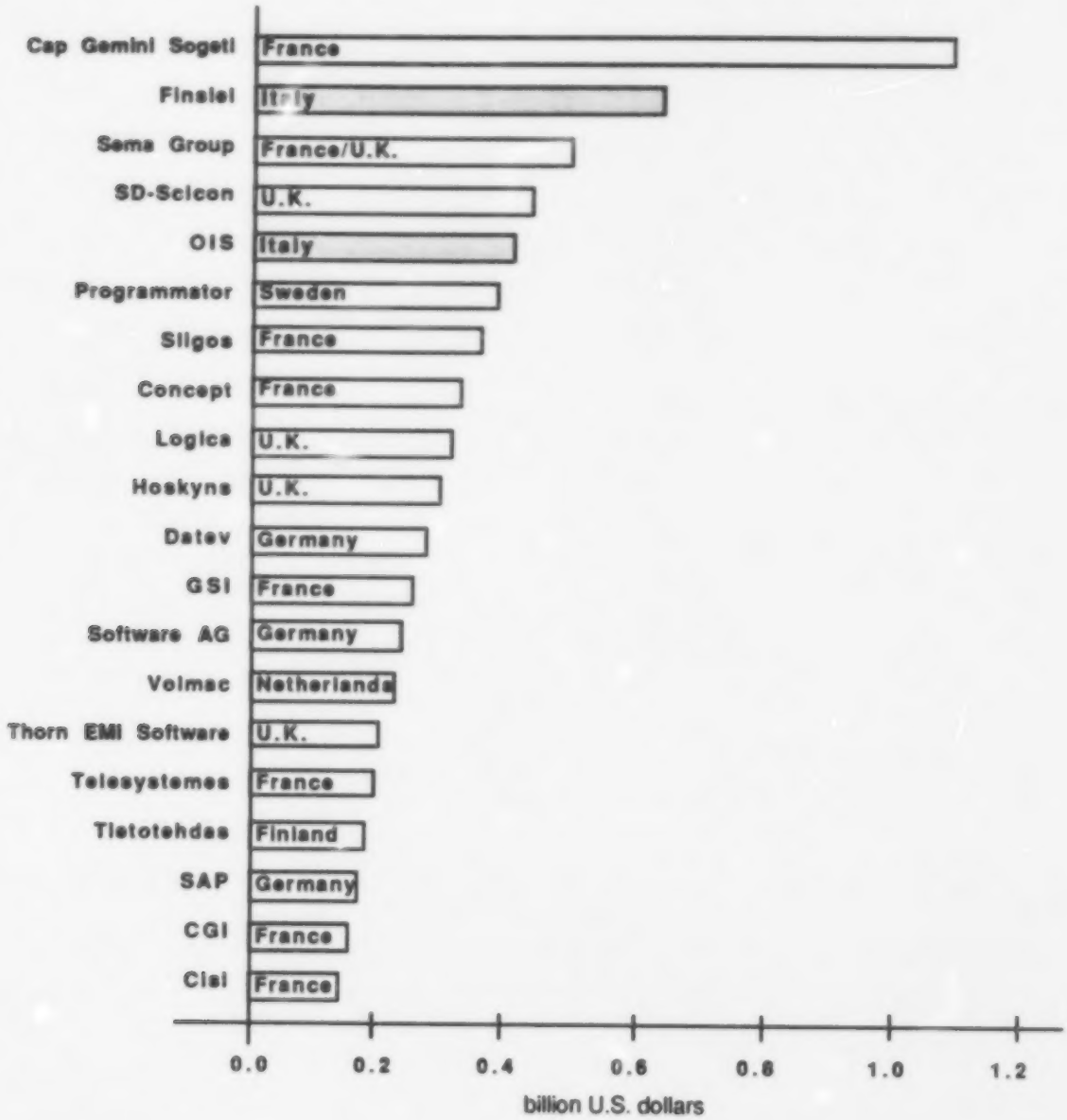
Table A4
IT market, 1989–94: Europe[a]
(million U.S. dollars)

	1989	1990	Growth 1989–90 (%)	1994	Growth 1989–94 (%)
Hardware					
Large	9,070	9,825	8.3	11,764	5.3
Medium	8,047	8,060	0.2	8,826	1.9
Small	6,725	6,888	2.4	8,112	3.8
PC workstations	21,741	25,377	16.7	38,069	11.9
Subtotal	45,583	50,150	10.0	66,771	7.9
Software					
Systems utilities	4,846	5,596	15.5	9,122	13.5
Application tools	3,976	4,985	25.4	10,753	22.0
Application solutions	5,575	6,791	21.8	13,442	19.2
Subtotal	14,397	17,372	20.7	33,317	18.3
Data communications					
LAN hardware	1,167	1,404	20.3	1,458	4.5
Other DC equipment	2,311	2,400	3.9	2,628	2.6
Subtotal	3,478	3,804	9.4	4,086	3.3
Services					
Support services	13,096	14,349	9.6	20,227	9.1
Professional services	16,895	19,620	16.1	32,748	14.2
Subtotal	29,991	33,969	13.3	52,975	12.1
Total	93,449	105,295	12.7	157,149	11.0

Source: IDC Europe.

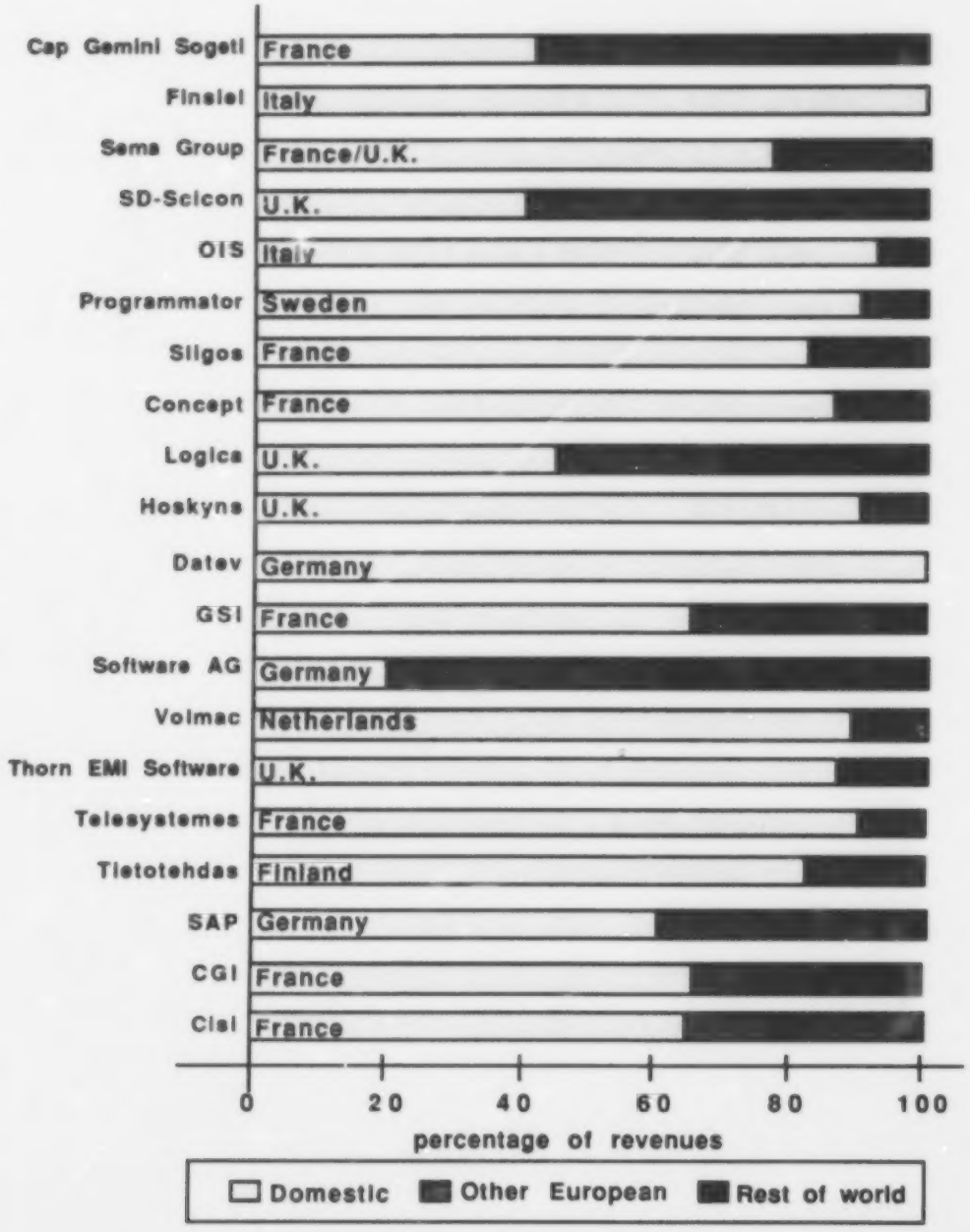
Note: [a]Austria, Belgium, Denmark, Finland, France, Germany (Federal Republic), Hungary, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and United Kingdom.

Figure A2
Top 20 companies in the European software and services market, 1990



Source: IDC Europe.

Figure A3
Geographical split of revenues for European software and services vendors, 1990



Source: IDC Europe.

Table A5
Western European software sales by application, 1990–93
(thousands of ECUs)

	1990	1991	1992	1993
Spreadsheets	611,000	777,000	889,000	932,000
Word processing	390,000	496,000	565,000	591,000
Database systems	271,000	346,000	397,000	419,000
Graphics packages	397,000	516,000	604,000	652,000
Communications packages	28,100	37,500	45,100	50,200
Integrated software	285,000	380,000	458,000	510,000
Accounting packages	210,000	276,000	326,000	354,000
Other application software	245,000	325,000	390,000	430,000
Total sales	2,437,100	3,153,500	3,674,100	3,938,200

Source: Ovum 1991.
Note: 1,000 ECUs = C$1,480 in 1992

Table A6
Top 20 Italian software groups

Company	Turnover 1990 (billion lire)	Employees	Ownership
Finsiel	874.0	5,363	IRI
OIS	570.0	3,600	Olivetti
Enidata	132.0	800	ENI
System & Management	128.0	582	Private
Cap Gemini Geda	113.3	670	Cap Gemini Sogeti
Cerved	106.0	586	Chambers of commerce
Data Base Informatica	104.0	1,230	Private
Andersen Consulting	84.4	758	Partners
Datamat	79.6	520	Private
Datamont	78.6	295	Ferruzzi/Montedison
ITP Italiana	75.5	323	Private
Sicit	73.0	320	Sopasin
Lombardia Informatica	70.0	316	Regione Lombardia
Sopin	61.5	280	Cofin
CDS Italia	57.0	280	Concept
Data Management	54.0	400	Credito Italiano Finsiel
Computer Associates It.	53.0	300	Computer Associates
Sime	48.0	411	Enimont
Datitalia Processing	47.2	322	Banco di Napoli
Coopeld	47.0	296	Co-operative companies

Source: IDC Italia 1991.

Figure A4
Galaxy of main Italian software and IT services groups

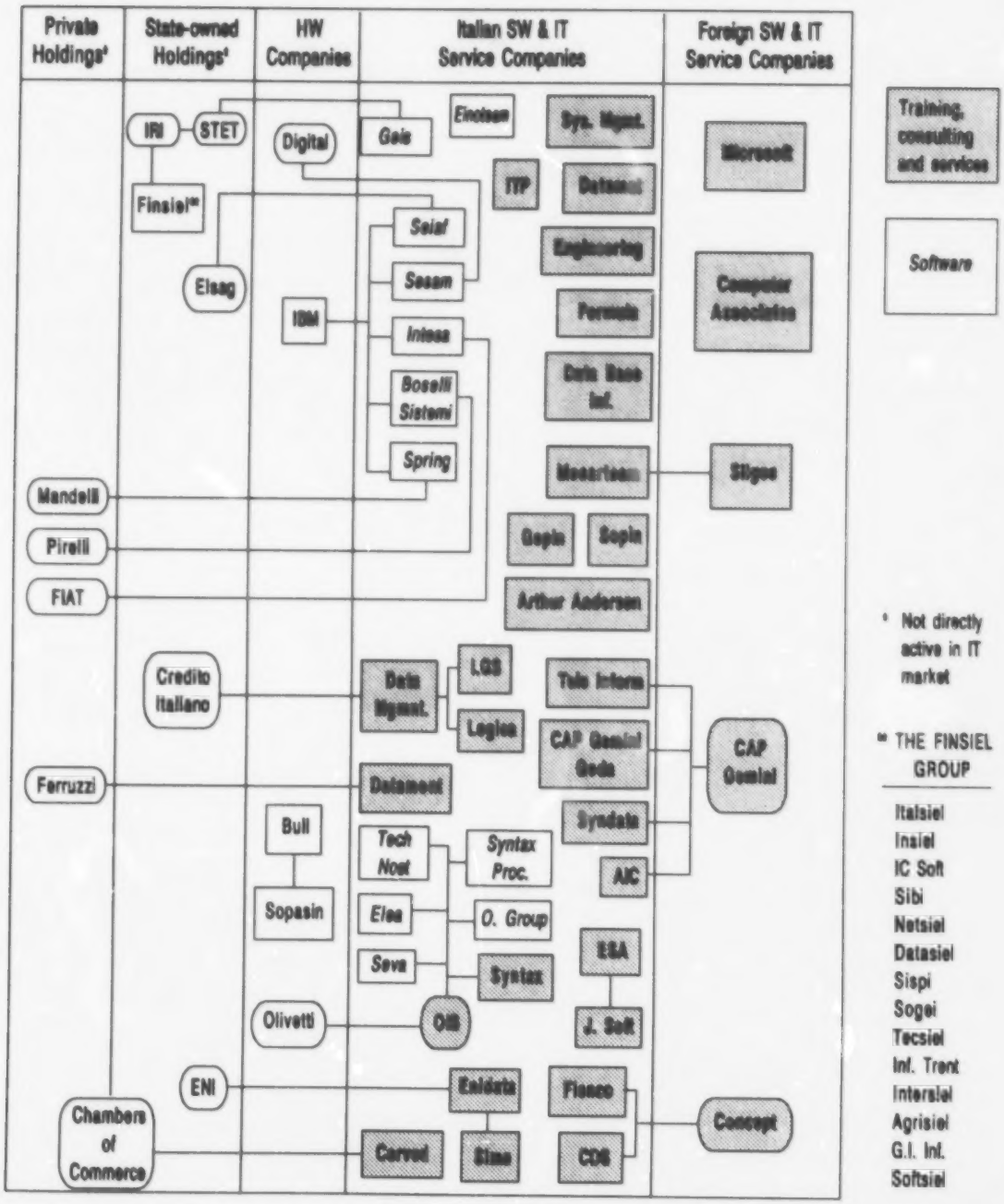


Table A7
Major GIS products and vendors in the Italian market, 1990

Product	GIS vendor	Telephone	Year of introduction	Platform	External database	Price indication (million lire)
Apic	Studio E. Magni	049-8073265	1982	unix, VAX, VMS	Oracle, Informix	50–70
Arc/Info 6.0	ESRI Italia	06-406961	N/A	unix	Oracle, Ingres, Informix	N/A
Argis 4Ge	Unisys	02-69851	1989	unix	Oracle (internal)	N/A
Cartograf	Adelphon	011-871277	1985	VAX, VMS	None	15–60
Cartograph	CSI Piemonte	011-33071	1990	unix	Oracle, Informix	25–40
Elisa	Ecobit	0721-25089	1988	unix	Ansi SQL	35
Erdas	Sistemi avanzati	06-5912590	1982	unix, VAX, VMS	None	25–30
Etagraph	Etnoteam Adriatica	071-959164	1988	unix	Oracle	30–80
GDS	McDonnell Douglas	02-2640219	1987	unix, VAX, VMS	Oracle, RDH	40–60
Geodis	IFM Infomaster	010-3770424	1988	unix	Oracle, Ingres, Informix	30–400
Geomanager	IBM	02-75481	N/A	370 e 390 IBM	N/A	N/A
Geosys	Geosystems	055-496943	1979	unix, VAX, VMS	Oracle	15–50
Infogis	Ifm Infomaster	010-3770424	1989	OS/400	SQL/400	50
Informap III	Tre Pi Progetti	06-3004440	1985	unix, VAX, VMS	Oracle (internal)	50–100
Karto	Minella e Carazzai	0437-888941	1984	unix	Oracle, Ingres	20–30
Mapinfo	CSH	011-657373	Not available yet	unix	None	5
MGE	Intergraph	02-8243043	1989	unix	Oracle, Informix	N/A
Pafec GIS	3D	035-232340	1991	unix	Oracle, Ingres, Informix	30
Sicad	Siemens data	02-25202579	1980	Bs2000	Oracle, Ingres, Informix	40–60
Sistema 5000	Italcad	02-33400150	N/A	unix	Oracle	70
Geigs	Gepin	06-500941	1981	VAX, VMS	N/A	200
Star Cartografia	Cdm	011-6690795	1990	unix	Oracle	40
System 9	Prime	02-74801	1988	unix	Oracle, Ingres, Informix	50–60
Tellus	Syscan	06-3332551	1991	unix	Oracle	32–75
Thema	Spectrum Graphics	06-9304520	1987	VAX, VMS	Oracle, Informix	40

Source: Mini Sistemi.

Table A8
CAD/CAM/CAE market share by company, 1989

	Company	Market (total %)		Company	Market (total %)		Company	Market % (SW services)		Company	Market % (SW Services)
1	IBM	15-17	13	Sun Microsytems	0.5–1	1	IBM	23–26	14	Sistemi	1–3
2	Digital Equipment	5-7	14	Olicad	0.5–1	2	Prime Computer	5–7	15	Gepin	1–3
3	Prime Computer	3-5	15	Gepin	0.5–1	3	Hewlett-Packard	5–7	16	Abo Data	1–3
4	Italcad	3-5	16	Sistemi	0.5–1	4	Italcad	5–7	17	SMC Computer	1–3
5	Apollo	2-4	17	Smc Computer	0.5–1	5	Digital Equipment	3–5	18	McDonnell Douglas	0.5–1
6	Hewlett-Packard	2-4	18	Acsis	0.5–1	6	CAD Lab	3–5	19	Mesarteam	0.5–1
7	Intergraph	2-4	19	Digitarch	0.5–1	7	Intergraph	3–5	20	CDM	0.5–1
8	Lectra Sistemes	2-4	20	Daisy/Cadnetix	0.5–1	8	Sysscan	3–5	21	Acsis	0.5–1
9	Brain Informatica	1%-3%	21	CDM	0.5–1	9	Mentor Graphics	1–3	22	Texas Instruments	0.5–1
10	Mentor Graphics	1%-3%	22	Bull H.N.	0.5–1	10	Matra Datavision	1–3	23	Daisy/Cadnetix	0.5–1
11	Sysscan	1%-3%	23	Mc Donnel Douglas	0.5–1	11	Brain Informatica	1–3	24	Racal Redac	0.5–1
12	Matra Datavision	1%-3%	24	Amplisystem	0.5–1	12	Autodesk	1–3	25	Micrograph	0.5–1
						13	Lectra Sistemes	1–3	26	Digitarch	0.5–1
	Subtotal (%)				**55.3**						**74.3**
	Others surveyed (%)				**5.9**						**5.0**
	Others estimated (%)				**38.8**						**20.7**
	Total companies				**804**						**365**

Source: Teknibank.

Table A9
Profile of major players in the IT market in Italy

Company	Turnover 1990 (billion lire)	Niche/activity[a]	Company address	Contact
Andersen Consulting	84	CASE Consulting in several segments: imaging processing, data communication, HIS	Via della Moscova 3, Milano	Bruno Ambrosini (Marketing Director)
Bachman Italia	3	CASE	Via Toselli 6, Torino	Luciano Balma (Director)
Bull HN Italia	1,090	CASE 4GL/DBMS Connectivity and networking Graphics and image processing GIS HIS (administration)	Via G.B. Pirelli 30/32, Milano	Bruno Pavesi (Chief Executive Officer)
Cap Gemini Geda	113	Networking (VAS) HIS (administration) CAD/CAM/CAE	Via C. Lombroso 54, Milano	Adolfo Cefis (Director)
CSI Piemonte	40	HIS GIS Image processing	C. so Unione Sovietica 216, Torino	Renzo Rovaris (Director)
Datamat	79.6	4GL/DBMS CASE Image processing	Via S. Martini 126, Roma	Giancarlo Giglio (Marketing Director)

Company	Turnover 1990 (billion lire)	Niche/activity[a]	Company address	Contact
Editrice Italiana Software	34	PC DBMS Connectivity and networking	Via Fieno 8, Milano	Ernesto Franchini (Marketing Director)
Esri Italia	N/A	GIS	Via Edoardo d'Onofrio 212, Roma	Sandro Gizzi (Marketing Director)
Etnoteam	18	CASE	Via A. Bono Cairoli, Milano	Alberto Cazziol (Marketing Director)
Fast Italia	15	Connectivity and networking	Via Flaminia 888, Roma	Nicola Rossi (Marketing Director)
Finsiel	874	CASE Connectivity and networking GIS HIS	Via Isonzo 21b, Roma	Bruno Scialpi (Marketing Director)
Gruppo Formula	25	4GL/DBMS Connectivity and networking	Via Susa 31, Torino	Alberto Gabbai (Chief Executive Officer)
Hewlett-Packard Italiana	468	CASE/OOP Connectivity and networking DBMS Graphics and image processing CAD/CAM/CAE HIS	Via di Vittorio 9, Cernusco sul Naviglio, Milano	Andrea Daretti (Marketing Director)

Company	Turnover 1990 (billion lire)	Niche/activity[a]	Company address	Contact
IBM Semea	8,500	DBMS Connectivity and networking Graphics and image processing CAD/CAM/CAE HIS	Via Fara 35, Milano	Luciano Martucci (Marketing Director)
Informix Italia	2	4GL/DBMS Graphics and image processing	Via Roma 108/E, Cascina de Pecchi, Milano	Piero Camurati (Third Parties Marketing Director)
Ingres Italia	4.5[b]	4GL/DBMS	Via Larga 23, Milano	Verrini (Chief Executive Officer)
Intergraph Italia	21	Graphics and image processing CAD/CAM/CAE	Strada 7 Palazzo R1 Milanofiori, Rozzano, Milano	Marzio Pierazzuoli (Marketing Director)
Italcad	36	Image processing CAD/CAM/CAE	Via Inverigo 6, Milano	R. Benedetto (Marketing Director)
Lombardia Informatica	70	HIS Connectivity and networking Image processing	Via Frigia 27, Milano	Marzio Mazzoleni (Marketing Director)
Mesarteam	35	CASE 4GL/DBMS	Via Vaninetti 27, Torino	Giovanni Ciampiella (Marketing Director)

Company	Turnover 1990 (billion lire)	Niche/activity[a]	Company address	Contact
Microsoft	40.5	Connectivity and networking Multimedia	Via Cassanese 224, Segrate Milano	Umberto Paolucci (Chief Executive Officer)
Novell Italia	8.5	Connectivity and networking	Via S. Vittore 40, Milano	Ettore Galasso (Marketing Director)
Olivetti Information Services	570	Graphics and image processing DBMS Connectivity and networking GIS HIS	Via Gaetano Negri 8, Milano	Franco Corso (Marketing Director)
Prime Computer Italia	54.6	GIS CAD/CAM/CAE	Via Rivoltana 13, Segrate, Milano	Marco Sbaraccani (Marketing Director)
Siemens Data	332.8	DBMS Connectivity and networking Graphics and image processing HIS GIS	V. le Monza 347, Milano	Renzo Tani (Marketing Director)
Siosistemi	7	Connectivity and networking (VAS)	Via Cefalonia 58, Brescia	Lorenzo Musicco (Marketing Director)
Stigma	N/A	HIS (clinical)	V. le Montegrappa 15, Pavia	Teresio Montagna (Marketing Director)

Company	Turnover 1990 (billion lire)	Niche/activity[a]	Company address	Contact
Sybase Products Italia	1	4GL/DBMS	Via Volturno 10, Sesto Fiorentino, Firenze	Querci (Chief Executive Officer)
Systems & Management	128	4GL/DBMS Connectivity and networking GIS Image Processing Multimedia	Via Alfieri 19, Torino	Vincenzo Monaci (President)

Notes:

CAD	computer-aided design
CAE	computer-aided engineering
CAM	computer-aided manufacturing
CASE	computer-aided software engineering
DBMS	database management systems
4GL	fourth-generation languages
GIS	geographic information systems
HIS	health information systems
OOP	object-oriented programming
PC	personal computer
VAS	value-added services

[a] Exclusively performed activities in the market segments surveyed in this study; does not include all the activities performed by each company.

[b] Turnover for 1991.